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An investigation into the food choice of older adolescents based on the Ajzen and Fishbein Theory of Reasoned Action, with outcomes being used as guidelines for nutritional education

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ABSTRACT

This study aimed to explain the food choices of first year university students by applying the Ajzen and Fishbein Model based on the Theory of Reasoned Action. Woodward et al (1991) satisfactorily used the Model to explain the food choices of adolescents in junior high school in Tasmania. Shepherd and Stockley (1987) also used this Model to successfully explain the consumption of high fat foods based on a person's beliefs and attitudes to these foods.

The Ajzen and Fishbein Model (Ajzen & Fishbein, 1980) contends that a behaviour is a result of an intention to perform the behaviour. However, this intention is determined by an individual's attitude to the behaviour and by the individual's perceived social norms to perform or not perform the behaviour, plus the individual's placing of importance on these determinants.

This Model was used as the basis for examining the relationships between students' liking of 22 foods, perceived health value of the foods, perceived parental usage, perceived friends' usage of the foods and the student's intention to choose the foods.

Students from the three schools, Arts and Music, Sport and Leisure Studies and Teacher Education, at the St George Campus of the University of New South Wales were used as a source of data, which

was collected via a questionnaire based on a questionnaire developed and used by Woodward et al (1991).

Regression analysis and the use of the Pearson Correlation Coefficient revealed that attitude towards a food was the most important determinant for 86% of the foods. The variable of "liking the food" was the only significant determinant for ten foods and significantly influenced the students' intention to choose for ten other foods. Full cream milk was the only food for which perceived health value was a significant determinant. The perceived "parental usage" of the food was a determinant for intention to choose for 59% of the foods. Perceived "friends' usage" was not significant for any of the foods in the study.

It is recommended that nutrition programs include taste tests, information on the varieties of foods available and instruction in evaluation skills to assist in making wise food choices.

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CHAPTER 1

INTRODUCTION

1.1 THE AIMS OF THE STUDY

This study aimed to describe the food choices of a group of older adolescents in terms of the Theory of Reasoned Action and to determine findings that may contribute to nutrition education programs which target this group, and thus contribute to the health of this group.

The health of Australians generally needs improving (The Health Targets and Implementation Committee, 1988). One essential aspect of improving health is changing people's food choices. Nutrition education is one method of bringing about this change. However, as food choice is influenced by many factors including social, cultural and economic aspects (National Health and Medical Research Council, 1989:1) and a wide and increasing variety of foods are available, the task of nutrition education is complex.

Fishbein and Ajzen (1975:387) assumed that if attitudes towards products can be changed, then subsequent changes in consumer behaviour may follow. In order to change attitudes it is necessary to have an understanding of the many social, cultural, psychological and economic forces which may inhibit the individual's resistance to

change. Examining how individuals or groups think and feel about a behaviour will help in developing and maintaining changes in behaviour (Holli & Calabrese, 1986:7).

The Theory of Reasoned Action, a socio-psychological model developed by Ajzen and Fishbein (1980), centres around the concept that no behaviour occurs without some thought process preceding the action. Ajzen and Fishbein believe that a person's intention to perform a certain behaviour is the main determinant of that overt behaviour. Fishbein and Ajzen proposed that intention to perform a behaviour is determined by the individual's attitude to the behaviour and the individual's perception of the social pressures to perform or not perform the behaviour. This proposition was formulated into a model explaining the relationship between beliefs and behaviour. This model is referred to as the Ajzen and Fishbein Model, or "the Model" in this study. The two determinants of attitude towards the behaviour and social norms regarding the behaviour, are considered predictors of the overt behaviour. As behaviour change is the main objective of nutrition education, an understanding of the determinants of the behaviour is likely to facilitate the design of education programmes.

Sheppard, Hartwick and Warshaw (1988) carried out two meta-analyses to investigate the effectiveness of the Ajzen and Fishbein Model in consumer research. They found 87 studies of the intention and behaviour relationship, and also 87 studies of the attitude, subjective norm and intention relationship. Some of these studies were common to both areas. Within all these studies only twelve (7%) were dealing with behaviours relating to food. These studies included behaviours involved in eating junk food, an apple, non fattening foods, drinking alcohol or a soft drink (Sheppard et al, 1988:333).

Woodward et al (1991) used the Model to elucidate the food choices of young adolescents, in junior high school, in Tasmania. They found that liking and parental usage were the strongest predictors for food choices and that friends' usage was a significant predictor for snack items. Similarly, Saunders and Rahilly (1990) used the Ajzen and Fishbein Model to examine the intention of American undergraduate and graduate university students to reduce dietary intake of fat and sugar. They found that the Model could be used satisfactorily to explain the differences in intentions between the health and non health majors.

1.2 THE USEFULNESS OF THE STUDY

Adolescence is acknowledged as a period of major transition in physical, psychological and social development as adolescents find their own identity and form closer friendships outside the family structure. Many studies have been performed on adolescent health risk behaviours such as bulimic eating and weight control patterns (Lauer,1990:8; Abraham, 1989). However, research into normal eating patterns seems to concentrate on food consumption and nutrient intakes (Bull, 1988:29). Studies into the determinants of adolescent food choice are less frequent (Woodward, 1986).

It seems appropriate that the point in time when new patterns of behaviour are forming is the time to make dietary changes which may have an effect on the adolescent's future health and the health of their future families. Finding out what influences the food choices of adolescents should be of benefit in developing general nutrition programs and dietary behaviour modification programs specifically for adolescents.

When dietitians and health professionals aim to change dietary behaviour, it may be important that they understand how this behaviour is formed so that appropriate modifying procedures can be used. In order to understand the reasons behind any particular behaviour, it is necessary to examine the social influences and the cognitive processes that determine that behaviour. Studies (Kayman, Bruvold & Stern, 1990; Storlie & Jordan, 1984) have shown that programs which include procedures to modify cognitive processes and social influences can result in more effective dietary modification than programs that do not include such procedures.

It has been reported by Skinner (1991:72) that nutrition courses can lead to significant changes in food choices and subsequently to improved dietary intake. With an improved understanding of the role of attitudes and subjective norms in influencing the food choices of first year university students, more effective nutrition education programs can be planned. For many older adolescents exposure to a nutrition course at university may be the only formal nutrition education which they encounter. The benefit to older adolescents once they leave the university environment should come from the new knowledge and attitudes, developed in the nutrition courses, which may lead to improved food choices.

In this study, the food choices of a group of first year university students were examined in light of the Theory of Reasoned Action. This study examined the relationships between a student's liking of the food, perception of the healthiness of the food, perceived parental usage, perceived friends' usage of the food and the student's intention to eat the food within the next week. Information on these relationships then contributed to recommendations for nutrition courses targeting this group.

CHAPTER 2

LITERATURE REVIEW

The purpose of this study was to investigate and determine the influences on the food choice of the older adolescent using the Ajzen and Fishbein Model and to use the results to plan effective nutrition education programs. A literature review was carried out to help define the terms involved in the study, to examine use of the Ajzen and Fishbein Model and to investigate relevant research concerning adolescents' food choices.

2. 1 DEFINITION OF TERMS

It is often confusing when reading research articles on food consumption or nutrition behaviour as different authors have different definitions of the terms used in this area.

2.1.1 Food Behaviour or Food Choice

Leitzman and Oltersdorf (1985) saw "food behaviour" as the activities directed towards obtaining, preparing and consuming food, including the social, symbolic and ritual values of food.

They also felt this behaviour was a result of planned, spontaneous or customary actions and reactions. On the other hand, although not discounting the spontaneous reaction, Ajzen and Fishbein (1980 p.5) believed that the majority of behaviour results from rational thought. Ajzen and Fishbein (1980) assumed that rational thought results in a particular behavioural intention and that this intention is the direct determinant of behaviour. As this project used the Azjen and Fishbein Model their meaning of the term "behaviour" was used throughout the study.

"Food choice" is a term used widely in the literature. Shepherd (1990) in his overview of the factors influencing food choice, suggested "food choice" is the key to altering people's nutritional intake. Shepherd's meaning of the term "choice" is the same as Ajzen and Fishbein's meaning of "behaviour", that is, the actual process of making decisions about whether or not to consume a particular food. In this study the terms of "choice" and "behaviour" are interchangeable.

The term "food choice" must not be confused with "food consumption" which is the actual process of eating and drinking (Leitzman & Oltersdorf, 1985). "Food consumption" is used interchangeably with "food intake" and "dietary consumption", and implies that some calculation and estimation is performed in order to determine the amounts of nutrients consumed. This study did not intend to estimate nutritional or food intake. However, determining food choice or behaviour and the influencing factors does enable a better understanding of ways to possibly improve nutritional intake.

2.1.2 Attitudes

"Attitudes" have been defined by Allport (1967 p.8) as a mental or neural state of readiness, learned through experience, which causes a person to respond to objects or situations in a positive or negative way. Allport (1967) suggested that attitudes are comprised of three main components - affective, cognitive and conative.

The affective component is concerned with an individual's feelings about an object or situation. Whether a food is liked or disliked depends on such factors as the sensory attributes of the food (Shepherd, 1990) and the person's range of experiences (Rozin, 1984 p.597). "Liking" was the term used in this study to exemplify this affective component and refers to the personal preference for a particular food based on a number of attributes including taste, texture, mouthfeel, colour and shape.

The cognitive component is concerned with the knowledge and intellectual processing of information about an object or situation. In relation to food it involves such factors as knowledge of nutrient content, source and cost of the food. Perceived "healthiness" was the aspect measured as the cognitive component in this study, and it refers to the health value of the food as perceived by the students.

The conative area is involved with an individual's tendency to behave in a particular way towards an object or situation. When used in discussing food choice, it tempers the effects of the affective and cognitive components in influencing an individual's food choice.

The above concepts and their inter-relationship, along with the examples used in this study, are shown in **Figure 2.1.**

2.1.3 Social or Cultural Factors

The environment in which an individual lives is a contributing factor to food behaviour. Historically, culture and technology have influenced the variety of foods available from which an individual can choose. Food is a medium of social expression (Rozin, 1984 p.593) and as such, food behaviour is in need of investigation when food choices are being investigated. Very little of the specific content of human appetite is innate (Booth & Shepherd, 1988 p.50) and as very young children we learn about food and the social setting in which food is consumed from our immediate family. It is through this socializing process that cultural traditions are passed on to the next generation.

As children grow and develop more social skills, learning about food and social appropriateness is derived from other people outside the immediate family. It is at this stage that the role of friends in the modelling of food behaviour becomes a more important influence (Bee & Mitchell, 1980 p.495). This factor is particularly important once a child begins school and continues through adolescence when the need to belong to a peer group and follow the norms of the group is more intense.

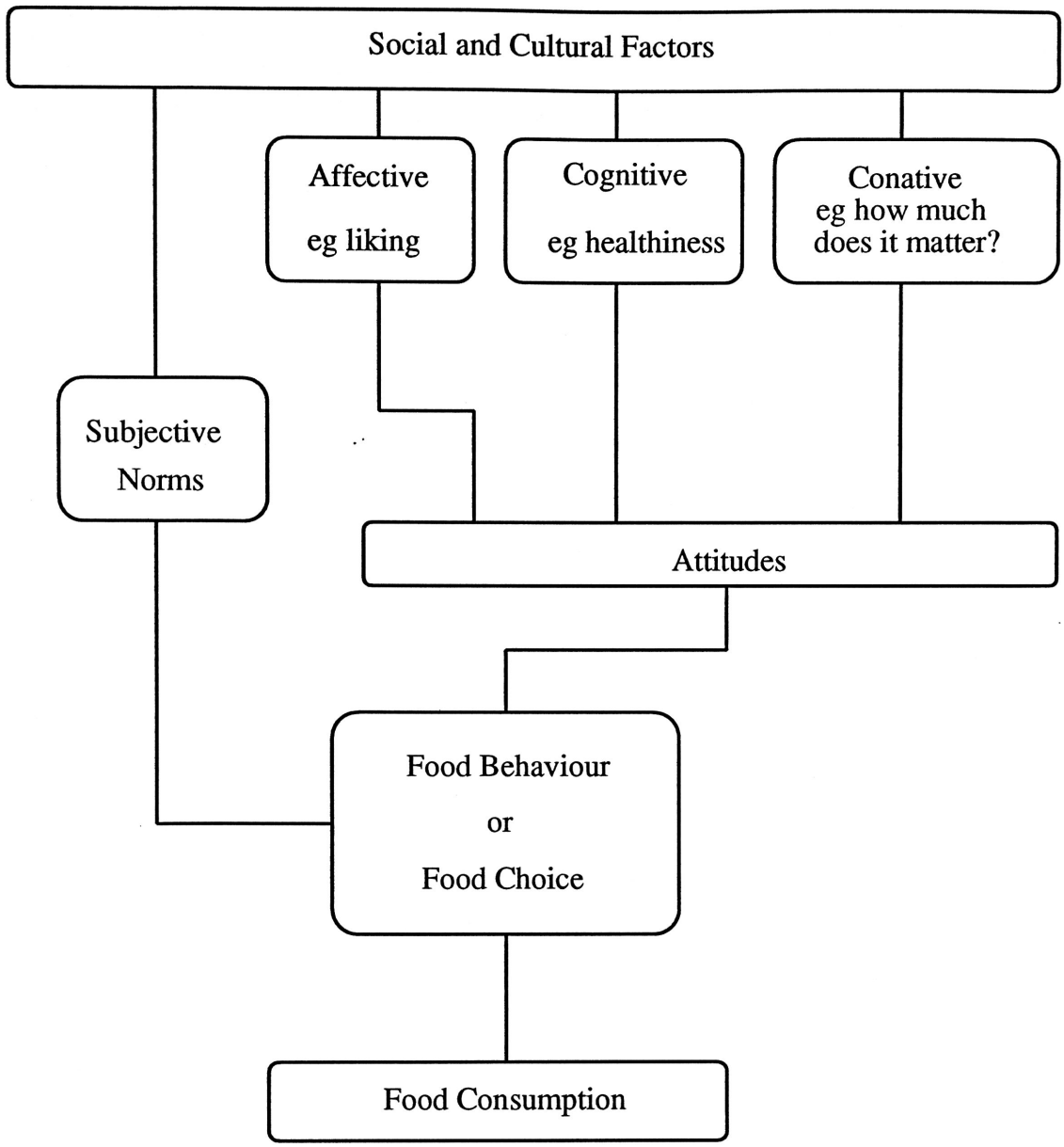

Figure 2.1: Inter-relationship Between Terms Used in This Study

2.2 THEORY OF REASONED ACTION

This study used the Ajzen and Fishbein Model (Ajzen and Fishbein, 1980) as the basis for the collection and analysis of data. This Model is a socio-psychological model based on the Theory of Reasoned Action (Ajzen and Fishbein, 1980; Fishbein and Ajzen 1975; Fishbein and Stasson, 1990; Ajzen and Madden, 1986).

The Theory of Reasoned Action was developed by Ajzen and Fishbein (1980 p.5) in order "to predict and understand an individual's behaviour". Ajzen and Fishbein believe that social behaviour is not a result of "unconscious motives or overpowering desires", but that it results from a conscious process of thought which uses available information interwoven with the individual's views and perceptions. In this theory it is the actual behaviour, eg choice of low joule foods, and not its outcome, eg weight loss, that is considered.

Ajzen and Fishbein (1980) proposed that a specific behaviour, as defined in terms of action, target, context and time (Fishbein & Ajzen 1975 p.292), is determined by the intention to perform or not to perform the behaviour within the same defined terms. This means that whether an individual performs a specific action in a set time and place, can be predicted to some degree by the individual's expression of intention to perform that action in the particular time and place.

Ajzen and Fishbein (1980) proposed that intention is determined by two sorts of factors - one personal and one social. The personal factor is the attitude that the individual has toward performing the action or behaviour in a specific situation. This attitude as proposed by Fishbein and Ajzen (1975), is determined by the perceived outcomes of

performing the action and of the individual's evaluation of these outcomes. These perceived outcomes or beliefs about a particular action or behaviour are modified by whether the individual sees these beliefs as beneficial or not.

The social factor which determines intention is called the subjective norm (Fishbein and Ajzen, 1975 p. 302), and is determined by the normative beliefs that an individual holds, modified by the degree of motivation to comply with these beliefs. The normative beliefs may be formed by an individual either accepting or rejecting information obtained through two processes. Firstly, someone important may tell the individual

what specific behaviour or action to adopt, and secondly, by the individual observing or receiving information about the expectations of someone important to the individual. Thus the social factor can be considered to be the pressures put on the individual to perform or not to perform a behaviour, by the people who are considered important to the individual.

The Model of the Theory of Reasoned Action, as shown in **Figure 2.2,** explains the relationships between the determinants as defined above, with the arrows indicating the direction of influence.

Fishbein and Ajzen (1975 p.400) proposed that for intention to change, there should be a change in one of the determinants beforehand. Attitudes toward behaviour can be changed by changing either salient beliefs about the behaviour or by altering the evaluation of these beliefs. Similarly, changing subjective norm, can be brought about

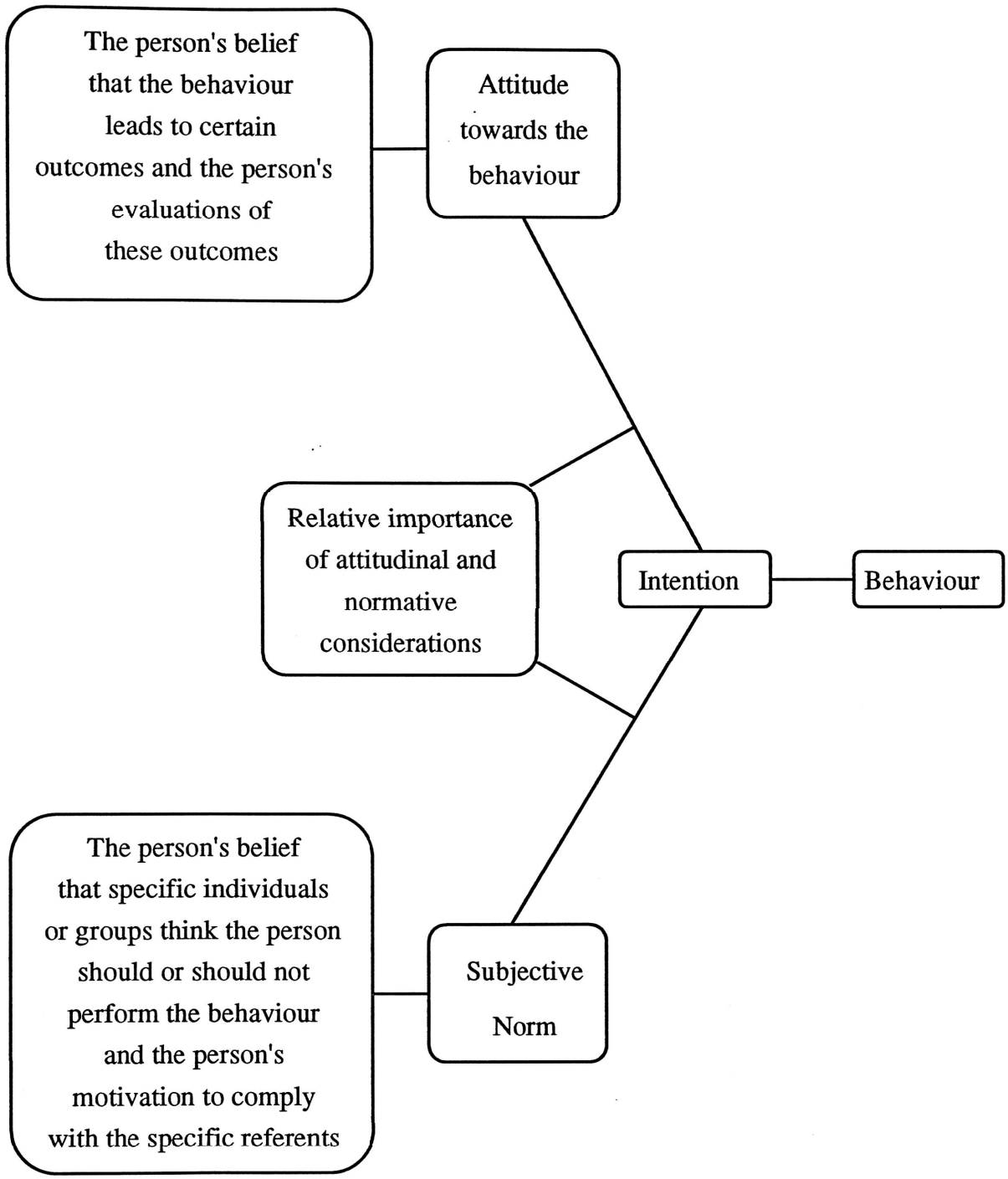

Figure 2.2: Factors determining a person's behaviour

(Ajzen & Fishbein, 1980 p8)

by either changing the normative belief or by changing the motivation to comply with these beliefs.

2.3 RESEARCH USING THE THEORY OF REASONED ACTION

The Theory of Reasoned Action has been used to investigate behaviour in the area of social psychology (Ajzen and Madden, 1986), consumer behaviour (Sheppard et al, 1988) and more recently food choice behaviour (Shepherd, 1990).

2.3.1 Non Food Based Research

Sheppard et al (1988) in their meta analysis of research up to 1983, found that, although over half of the research had used the Model to investigate goals instead of actual behaviour, the research supported the Ajzen and Fishbein Model as a reliable predictor of behaviour from intention. However, the Model appeared to be inaccurate in predicting intention from subjective norm and attitudes. More recent research by Goldenberg (1991) who investigated intended care behaviour of nursing students with AIDS patients, suggested that students' attitudes and subjective norms were significant predictors of intentions.

Weerdt et al (1990) in their study of self care behaviour in insulin treated patients with diabetes, used the Theory of Reasoned Action and the Ajzen and Fishbein directives for questionnaire formation. These authors showed that attitude is an important determinant

for self care behaviour and that a positive attitude correlated positively with an adequate knowledge base and negatively with the subjective norm component of the Model.

These studies by Sheppard (1988), Goldenberg (1991) and Weerdt et al (1990) suggested that the Theory of Reasoned Action is an adequate model to use for improving understanding and for predicting behaviour.

Ajzen and Madden (1986) suggested that intention as a predictor of behaviour is inaccurate if the individual does not have complete control over the behaviour. They proposed that the Theory of Planned Behaviour may be a better model as it includes a measure of the degree of individual control as perceived by the individual. Research supporting this proposal has been done by Ajzen and Madden (1986), Netemeyer and Burton (1990), Netemeyer and Burton and Johnston (1991).

Fishbein and Stasson (1990) in their study of employee attendance at a training session, similarly compared the Theory of Reasoned Action and the Theory of Planned Behaviour. However, these authors found that the inclusion in the statistical analysis of a measure of perceived control did not improve the prediction of actual attendance at training sessions. The most important determinants for predicting attendance at the training sessions were the workers' desire to attend and their belief that their supervisors thought they should attend.

This study did not include a measure of perceived control in the statistical analysis, firstly, as there is some disagreement as to its value in predicting behaviour, and secondly, for research simplicity and clarity.

2.3.2 Food Based Research

The meta analysis of Sheppard et al (1988) indicated that approximately twelve percent (12%) of the studies in the analysis were involved with food. This meta analysis was performed on research prior to 1983. Since 1983 there has been very little published research using the Ajzen and Fishbein Model to predict or investigate food behaviour.

In the United Kingdom, Shepherd and Stockley (1985, 1987) have investigated fat intake using the Ajzen and Fishbein Model. These authors looked at whether nutrition knowledge could be used to predict attitude to high fat foods or the actual consumption of high fat foods. In Shepherd and Stockley's study with two hundred and twelve respondents (1987) the four foods considered were meat, meat products, margarine and milk as these contribute to fat consumption in the United Kingdom. To describe the relationships between the variables in the Ajzen and Fishbein Model, Shepherd and Stockley (1987) performed multiple regression analysis separately on each of the above four foods, and again on the combined scores for all the foods. These analyses indicated that behaviour could be reliably predicted, with attitude being the more important determinant. Nutritional knowledge did not correlate with any of the variables in the Model.

Shepherd (1990) reported a similar study involving two hundred and forty subjects which investigated the consumption of meat, meat products, dairy products and fried foods. The subjective norm variable of the Model was not included as it had previously been shown to be insignificant in predicting behaviour (Shepherd, 1990 p.23). This particular study showed that taste and perceived health value had the greatest correlation with the attitude to the foods and to intention to consume the foods.

Another study reported by Shepherd (1990) involved measures of habit and perceived control in the questionnaire. This study indicated that the role of habit significantly improved the prediction of intention from subjective norm and attitudes and similarly increased the prediction of behaviour from intention. However, like the study of Fishbein and Stasson (1990), the addition of perceived control did not improve the predictive property of the Model.

In the United States of America, Saunders and Rahilly (1990) reported using the Ajzen and Fishbein Theory of Reasoned Action to gain an understanding of the factors influencing the intention to reduce dietary intake of fat and sugar. These authors surveyed eighty six graduate and undergraduate students enrolled in health courses. Their results indicated that the Ajzen and Fishbein Model explained 41% of the variance in behavioural intention. Another result showed that students with most of their subjects in the area of health were more influenced by attitudes while the students who where not taking health subjects were more influenced by subjective norms.

The above results had implications for this study. As some of the students in this study were enrolled in the School of Sport and Leisure Studies and as health principles formed a major component of the study, results may support those reported by Saunders and Rahilly (1990). This means that those studying in the area of Sports and Leisure Studies may be more influenced by attitudes while those in other schools may be more influenced by subjective norms.

The only study using the Ajzen and Fishbein Model to explain food choices or behaviour in Australia was reported by Woodward et al (1991). However, Woodward reported (1991 - personal communication) that at least two more studies, other than this

one, were being undertaken in Australia with different populations. In Woodward's study (1991) regression analysis was performed on each of the foods and although the regression coefficients varied with each food, liking and parental usage were the main determinants. However, for snack items, friends' usage was the greatest determinant, and perceived healthiness was not considered an important determinant.

2.4 ADOLESCENT FOOD CHOICES

Because adolescence is a period of much physical, social and psychological development it is an opportune time to develop positive attitudes about foods, hopefully leading to sound dietary behaviour. Researchers (Abraham, 1989; Bailey & Goldberg, 1989; Lauer, 1990) have found that health problems originate during this transitional period when new habits are developing.

Food behaviour has been studied for many years and in a number of contexts. One such context is that of weight reduction and although various programs have been developed to help people lose weight by changing eating patterns, only about 5% of participants in these programs maintain their weight loss (Kramer, Jeffery, Foster & Snell, 1989, p.136, cited in Foreyt and Goodrick, 1991, p.292). In order to improve the success rate of these dietary behaviour modification programs, it is essential that planners have an understanding of why attendees make particular food choices.

Obesity and overweight are caused by numerous interrelated factors, one of which, knowledge about weight control principles, is just a minor contributor. Storlie & Jordan (1984, p.115), Burns, McGeorge and Caterson (1988, p.275) and Kayman, Bruvold and

Stern (1990, p.800) proposed from investigations that to be effective programs need to provide support so that changes in participants' lifestyles and thus behaviour will occur. To change behaviour it is necessary to understand what causes current behaviour and it is suggested that areas for investigation need to include social influences and cognitive processes (Storlie & Jordan, 1984, p.115).

The problems of overweight and obesity may be the result of simple overeating, which is the commonest cause of eating disorders (Haskew & Adams, 1984, p.6). In fact, while 40% of women between the ages of 18 and 40 years feel they have problems with their weight, 20% feel they are disordered eaters (Abraham,1989). Many of these problems associated with eating and weight control methods begin during adolescence.

It is frequently reported that the dietary practices of the older adolescent and the young adult are far from ideal (Bailey & Goldberg, 1989, p.95; Bull,1988, p.66). If these dietary practices are to be changed, whether at a community or individual level, it is necessary to understand the relationships between adolescent beliefs, attitudes and behaviour.

An early study of adolescents by Truswell and Darnton-Hill (1981) reported that students showed a preference for high energy foods especially fast foods and take away foods. The study also reported that the students had strong likes and dislikes and frequently missed meals and consumed snacks.

George and Krondl (1983) looked at food choices of one hundred and thirty five adolescents aged fourteen to sixteen years. The results were similar to Truswell and Darnton-Hill's study in that the boys more frequently chose foods high in fat, salt and

sugar, while the girls selected vegetables more often than the boys. The perceived healthiness and taste of the foods influenced the adolescents' frequency of selection.

A report on the food intakes of one thousand and fifty five Tasmanian high school students aged from eleven to sixteen years, by Woodward (1986) not only looked at the nutrient intakes, but included analysis of fifteen different foods. Woodward examined

the effect of physical, behavioural and social characteristics on the selection of the foods. Some of the results show that with an increase in age there was, for the boys, an increase in the consumption of bread, potatoes, nuts and legumes and non milk dairy foods. Further, those students whose parents were better educated had food choices more closely fitting the dietary guidelines.

As can be seen from the above discussion, there are only a few studies on Australian adolescent food choices in the literature, and none on the older adolescent. However, it is acknowledged that food choices are determined by previous experience and culture with some taste changes developing with age (Rolls, 1988).

Based on the theoretical findings of the research, this study will increase the understanding of why the older adolescent or young adult makes certain food choices. This understanding will be of benefit in developing nutrition education programs, be they general programs or dietary behaviour modification programs. Including components which are matched to social and cognitive functions of this age group should improve the effectiveness of the education programs and so increase the success rate of dietary modification programs.

CHAPTER 3

RESEARCH PROBLEM

3.1 STATEMENT OF THE PROBLEM

With reference to theories of health behaviour and from personal observation of students' behaviour, the problem identified for this study was:

What is the relative impact of attitudes and subjective norms on intentions of the older adolescent to make certain food choices within the next week?

The above question gave rise to the following hypotheses or the sub-problems which formed the basis for the data collection and analysis.

3.2 STATEMENT OF HYPOTHESES

3.2.1 First Hypothesis

Students who intend to choose a particular food within the next week will have actually chosen the same food in an average week.

3.2.2 Second Hypothesis

Students' attitudes towards the behaviour and students' subjective norms will predict intention to choose particular foods within the next week.

3.2.3 Third Hypothesis

Students who like a particular food will

- intend to choose that food;
- choose that food.

3.2.4 Fourth Hypothesis

Students who believe that a particular food is healthy, will

- intend to choose that food;
- choose that food.

3.2.5 Fifth Hypothesis

Students who believe that their parents choose a particular food often, will

- intend to choose that food;
- choose that food.

3.2.6 Sixth Hypothesis

Students who believe that their friends choose a particular food often, will

- intend to choose that food;
- choose that food.

3.3 VARIABLES

3.3.1 Independent Variables

There were four independent variables for this study. The two variables of "liking" and "healthiness" were combined to form the attitudes component within the Ajzen and Fishbein Model. The other two variables of perceived usage by "parents" and "friends" were similarly combined to form the subjective norm component of the Ajzen and Fishbein Model. These variables are an indication of their beliefs and were measured to determine the impact that they have on the dependent variables.

3.3.2 Dependent Variables

The dependent variables in this study were the students' intentions to select particular foods within the next week and the students' answers to questions about their actual choice of foods over an average week. These variables were measured so that the degree of influence of the four independent variables could be estimated.

3.4 MODEL OF THE STUDY

Figure 3.1 is a schematic representation of the relationships that are postulated to exist between the attitudes and subjective norms of the students and their intention to consume the foods, as based on the Ajzen and Fishbein Model (1980). In the literature it has been shown that this Model can be used to explain and predict behaviour. This study aims to investigate how well the variables of attitude and subjective norm can explain the food intention and behaviour of the older adolescent.

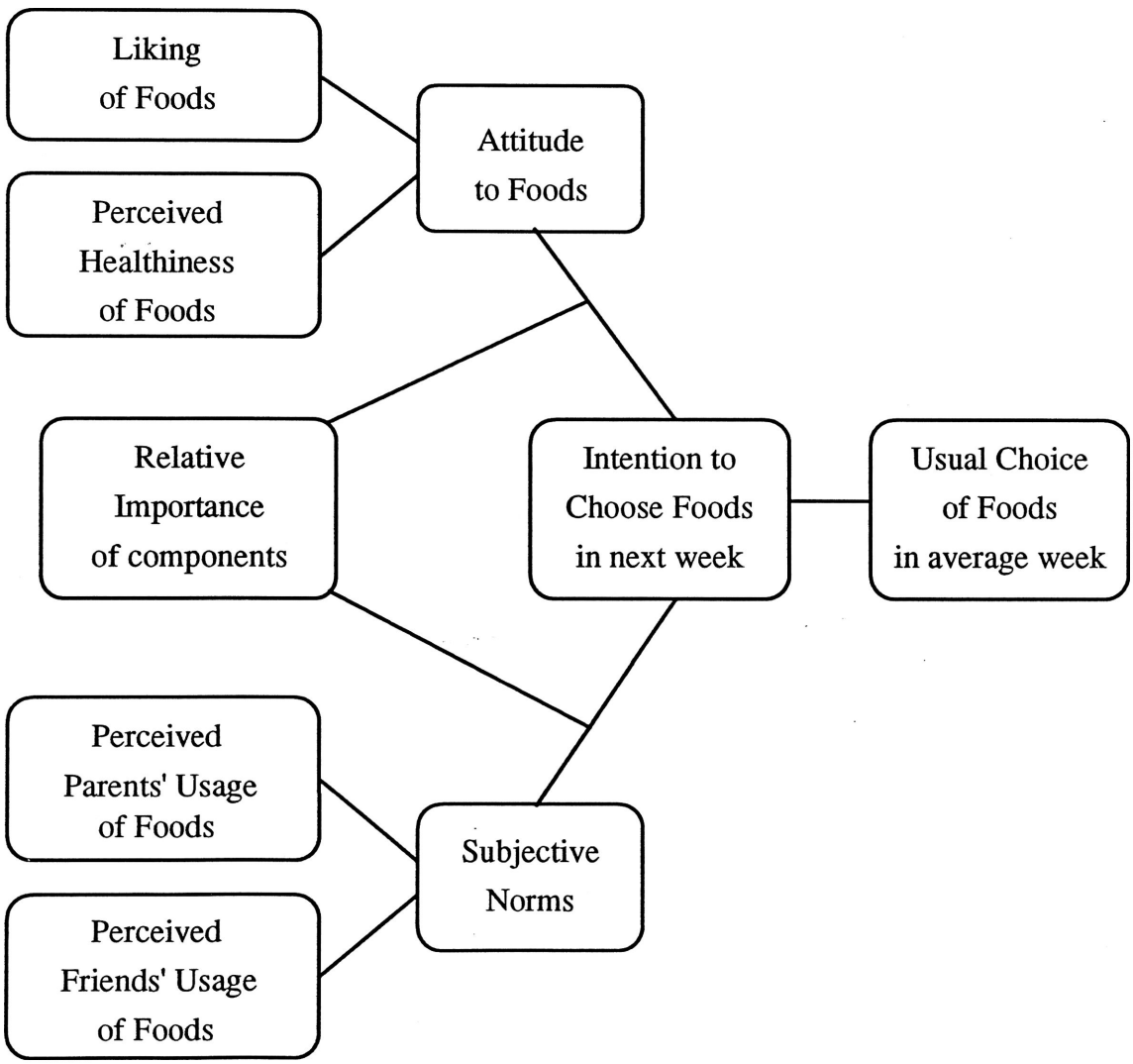

Figure 3.1: Model of Study based on Ajzen & Fishbein Model (1980)

CHAPTER 4

DESIGN OF THE STUDY

This study into the suitability of the Ajzen and Fishbein Model to explain the food choices of first year university students employed analytical survey research design. It involved the development of the instrument or tool to collect the data, the selection of the population to study and the use of statistics to evaluate the hypotheses previously stated.

4.1 ORIGINS OF THE STUDY

The factors influencing people's food choice has always been of interest to the author, being a lecturer in a nutrition course, in the Bachelor of Applied Science at the University of New South Wales, the author has an expectation that students will examine the factors that influence their own food choices.

Woodward et al (1991) presented a paper at the Annual Conference of the Dietitians' Association of Australia, titled "Using a social-psychological model to study adolescent food choices". Their conclusions were that the Ajzen and Fishbein Model could be successfully applied to explain the food choices of secondary school students in Tasmania. Although the Ajzen and Fishbein Model had been used successfully by other

researchers to examine food choices in countries other than Australia (Shepherd and Stockley, 1987), it had not been used in Australia before Woodward et al (1991). Woodward (1991-personal communication) concurred that a study of university students would be interesting because of the older age of the adolescents in the proposed survey group.

4.2 QUESTIONNAIRE DESIGN

4.2.1 Origins of the Instruments

A copy of a questionnaire used by David Woodward was forwarded to the author following verbal approval to use it in this study. As a basis for examining food behaviour, the questionnaire used by Woodward et al (1991) sought details of various aspects of twenty two different foods covering the major food groups. These aspects included the students' frequency of choice of foods, the degree of liking, perceived health value and the frequency of usage by parents and friends.

Woodward's questionnaire contained questions on the preferred method of cooking meat, the preferred amount of fat left on meat, types of bread and margarine used and the number of glasses of milk usually consumed each day. From discussions with Woodward, the answers to these questions were not essential for the statistical analyses involved in the testing of the Ajzen and Fishbein Model.

4.2.2 Format of the Questionnaire

Woodward's questionnaire was divided into eight sections. The first section collected demographic data and the other seven sections contained instruments to measure the variables. Six of these seven sections questioned attitudes, social norms and behaviour in relation to twenty two foods. The order of the twenty two foods was different for each of the six sections. The remaining section measured the students' motivation to comply with their attitudes and social norms. The students responded to the questions using an eight point Likert scale for food behaviour and a five point Likert scale for all other variables.

The questionnaire used in this study followed a similar format, but there were some differences in details within each of the sections.

Minor alterations were made to the descriptions of the twenty two foods due to the differences between Tasmania and Sydney, these being terminology used for particular foods and food availability. These modifications were discussed with Woodward in August 1991 and included:-

"Glass of low fat or skim milk" became "Low fat or skim milk (plain or flavoured)" as in Sydney "Lite White" milk is available in plain as well as flavoured varieties, and to include choice of cartons of milk which may be consumed by this age group.

"Glass of plain or flavoured milk" became "Full cream milk (plain or flavoured)" also to include choice of cartons.

"Cordial or soft drink" became "Soft drink" as the term "cordial" in Sydney refers to a different type of beverage.

A copy of the questionnaire is appended as **Appendix A.**

A list of the twenty two foods used in the questionnaire, and their abbreviations as used in Table 5.1 and Figure 5.4, is appended as **Appendix B.**

4.2.3 Demographic Information

As the students in this study were older than the students studied by Woodward et al (1991), the format of the demographic questions was modified. Information on seven categories was sought in the first part of the questionnaire.

The students were asked to note their age, height and weight. Also the students were to indicate which School within the university they were enrolled in and whether they had studied nutrition in any form. In the question relating to their home situation, the students were to indicate whether they were living "on their own", "with friend/s or spouse" or living "at home with at least one parent or other older person". These choices were determined through asking current third year students for descriptions of their living situation in first year, as part of a pilot study.

The seventh question concerned the number of days per week the respondent consciously did some form of exercise or played sport. The students were asked to indicate this on an eight point scale (0 - 7).

4.2.4 Measurement of Behaviour

The behaviour instrument, Section A of the questionnaire, assessed reported food behaviour with respect to the 22 foods, using "yes" or "no" responses to the question "Did you eat or drink the food yesterday?" These responses, however, were not used in the analyses of this study. To determine usual behaviour patterns, the students were asked to circle the appropriate number of days in answer to the question "In an average week, on how many days would you eat it?".

4.2.5 Measurement of Attitude

This instrument made up two sections of the questionnaire, Sections B and C.

In Section B students were asked how much they "liked" each of the twenty two foods, rating their responses on a five point scale from "love it" to "hate it". There was an alternative option of "never tried it" for students to indicate if they had not eaten the food.

Section C, asked how "healthy" the students thought each of the foods were, again on a five point scale ranging from "very healthy" to "very unhealthy". Provision was also given in an alternative column for the option "I really don't know".

4.2.6 Measurement of Intention

The original questionnaire used by Woodward et al (1991), did not contain a measure of intention. Woodward felt that the young age of the respondents and their lack of control over foods eaten, may have led to inaccurate measures of intention (Woodward, 1991- personal communication), and so limited their measurement to actual choice of the foods. Ajzen and Fishbein (1980, p.97) state that it is necessary to include a measure of the intention to perform the behaviour in order to fully understand the relationships proposed in their theory.

In Section E of the questionnaire the students were asked to determine their intention to eat each of the twenty two foods within the next week. The time period of one week was selected to correspond to the same time frame as the behaviour instrument, as outlined by Ajzen and Fishbein (1980, p.261).

The students were asked to indicate their intention on a five point scale similar to the previous instruments, ranging from "very likely" to "very unlikely". As with the other instruments, the option "really don't know" was provided for the respondents who were unsure of their own intentions with respect to particular foods.

4.2.7 Measurement of Subjective Norm

This instrument also comprised two sections of the questionnaire, Sections F and G. The subjective norm instrument was designed to measure the students' perceived social pressures to choose or not to choose each of the 22 foods.

Ajzen and Fishbein (1980, p.263) suggest that normative beliefs be measured by questions in the form of "My parents/friends think I should/I should not" eat the following foods. Woodward et al (1991), however, used the format of "How often do you think your parents/friends eat the following foods". Following discussion with David Woodward, these two formats were trialled with some third year students. The second format, which the students found easier to answer, was used in the final questionnaire used for this study.

The students were asked to indicate how often they thought their parents/friends would eat each of the 22 foods, rating their perception on a five point scale ranging from "very often" to "very rarely". As with the other instruments, the option of "really don't know" was provided for students unsure of their perception.

4.2.8 Measurement of Influences on Food Choice

The questions designed to record the students' self reported influences on food choice were inserted as Section D to break up the flow of the questionnaire and make the respondents think about their responses.

Section D of the questionnaire was taken from the original questionnaire used by Woodward et al (1991). Section D asked the students how much each of the variables, measured elsewhere in the questionnaire, mattered to them when deciding whether or not to eat a food. The students were asked to indicate on a five point scale ranging from "matters very much" to "doesn't matter at all".

The information gathered from this section was used to help describe the study population and was not used in the calculations involved with Ajzen and Fishbein Model.

4.3 THE PILOT STUDY

As the original questionnaire used by Woodward et al (1991) had been modified it was necessary to pilot the new questionnaire. The trial questionnaire contained two of each of the Sections F and G as stated above.

The first trial was with 18 third year students enrolled in the Bachelor of Applied Science degree at the University of New South Wales. Thirteen of these students were aged 19 to 22 years, while the remaining five were aged 27 to 44 years. As well as being asked to complete the questionnaire they were asked to:

* indicate any ambiguity in the instructions,
* identify the forms of Sections F and G which were easiest to answer,
* comment on the length or the questionnaire,
* seek clarification of terms and ask questions,
*suggest changers.

When the two forms of the pilot questionnaire were analysed, it was observed that similar responses were recorded for each of the two forms used. Ten of the thirteen younger respondents found the questions on usage easier to answer and stated that they had to think about whether their parents/friends approved of the food being chosen

before they could answer "How often do you think your parents/friends eat these foods?". Following this pilot, it was decided to use the question about the perceived frequency of parents' food choice, as the results would be more reliable if the students found the questions easier to understand and answer.

In the demographic data some respondents had written their weight in stones and pounds, and height in feet and inches. To overcome this, the abbreviation "cm" was placed next to the bracket for height and the "kg" next to weight. For the students completing the questionnaire, conversion factors were provided. Eight of the respondents said the questionnaire was too long, however, this may have been due to the two extra pages used to test the forms of the question for Sections F and G. In order to reduce the perceived length of the eight page questionnaire the eight pages were reduced by photocopying so that they fitted onto four pages.

A second pilot was carried out with second year students doing a nutrition subject at Wollongong University. Seventeen students returned the questionnaires with one questionnaire being omitted from the study due to invalid responses. The statistical program "Statview 512+" was used to calculate the Pearson Correlation Coefficient between the variables of the Ajzen and Fishbein Model. The results indicated that intention to consume a food was significantly correlated to the usual choice of the food, and that attitude, especially "liking a food", was more statistically significant in influencing intention than was the subjective norm component of the Ajzen and Fishbein Model.

4.4 QUESTIONNAIRE FORMAT

Following the pilot study results, the format of the questionnaire did not change and six weeks after obtaining Woodward et al's original questionnaire, the questionnaire was in its final format with eight sections as described above (**Appendix A**).

A note was included at the beginning of the questionnaire covering the broad area of the study, the confidentiality of the results and the directions for completing the questionnaire.

4.5 SURVEY POPULATION AND ETHICS

Skinner (1991, p.73) found that significant dietary changes occurred during a ten week study is to survey students without detailed nutritional knowledge, therefore only first year students attending the St George Campus of the University of New South Wales were used.

An initial approach was made via a letter to the Heads of School for Art and Music, Teacher Education and Sport and Leisure Studies. This letter (**Appendix C**) concerned the purpose of the study, issues of confidentiality, and the availability of results and sought approval to approach the first year students and the appropriate lecturers within their schools.

Following approval of the Heads of School, personal arrangements were made with individual lecturers for suitable times and days on which to distribute the questionnaire.

Approval was also obtained from the Human Experimentation Ethics Committee of the University of Wollongong (**Appendix E**).

4.6 DATA COLLECTION

Each of the Heads of School and the lecturers of first year groups were extremely obliging and were prepared to allocate approximately fifteen minutes for their students to complete the questionnaire. The author personally distributed, explained and collected the questionnaire to Art and Fibre, Dance and Drama, Leisure Studies and Education groups. For the Music, Sports Science and Coaching groups the questionnaire was administered by the lecturers. All questionnaires were completed and collected at the time they were distributed.

The data gathering took place over a two week period and involved the distribution of 216 questionnaires, this being the total number of first year students. As some students were away, only 172 questionnaires were completed and collected.

4.7 DATA ANALYSIS

The data was analysed using the "Statview 512+" program on a Macintosh Classic computer. Each of the 22 foods was considered independently and the foods grouped into the five food groups and two other groupings, snacks and drinks. The data from the questionnaire was entered into the computer as symbols or numerical codes. The "I don't know" responses for each item were given a "0" code and not included in the statistical analyses.

To decide which of the determinants, attitude or subjective norm, made the greatest contribution to intention, the sums of squares resulting from the regression analyses on each of the twenty two foods were used. The sums of squares from the regressions of the two attitude variables onto intention were subtracted from the total sum of squares from the multiple regressions of the four variables onto intention. The determinant with the largest sum of squares explains a significant amount of the variation in intention.

Multiple regression analysis was used to determine the extent to which each of the attitudes and subjective norms could determine intention to consume the foods. To reduce the Type I error, the significance level was taken at .1% ($p<.001$). From the regression of the four independent variables onto intention, those variables with significance levels above $p=.001$ were omitted from a further regression analysis. This final regression analysis was used to develop regression equations for each of the 22 foods and the food groupings. The Pearson Correlation Coefficient was used to determine the relationship between usual food behaviour and behavioural intention. For this analysis a significance level of 0.05 was considered appropriate. Descriptive statistics, including mean, standard deviation, variance, and frequency distributions for the values on the Likert scales for each food item, were calculated to help determine the food most frequently consumed by the first year students, and to determine if differences existed between the students in different schools, with different levels of nutrition knowledge and different exercise levels.

4.8 THE QUESTION OF BIAS

Care has been taken to reduce the influence of bias on the results although it is acknowledged that bias is inherent in all research, including during sampling, statistical analysis and interpretation.

The sample in this study was not randomly obtained, the students were asked to volunteer to complete the questionnaire, however, all the students present at the time did complete a questionnaire. As this was a study on the older adolescent students over the age of 21 years were not included in the statistical analysis.

To avoid the possible researcher bias on the allocation of the foods in their random order in the intentions instrument, the food names were drawn out of a hat by a person not concerned with the study.

No recording of the students' name was required for the questionnaire in the hope that the replies would be as honest as possible. However, it is acknowledged that some bias could result from careless responses from those students not interested. Also no effort was made to locate those students who were absent from their class, so that not every first year student attending St George Campus of the University of New South Wales actually completed the questionnaire.

CHAPTER 5

RESULTS

Of the proposed 216 potential student responses, only 172 questionnaires were returned. This shortfall was attributed to approximately 20 Sports Science students being absent due to an exam, plus normal absences from lectures. Of the returned questionnaires, 23 were not included in the study because whole sections were not completed. The reason for this is not known, however, as the final sections were more frequently omitted, the length of the questionnaire may have contributed to the students' failure to complete these sections.

Of all first year students enrolled in the Schools of Arts and Music, Teacher Education and Sports and Leisure Studies, 75% were included in this study. The mean age of the students was 19.2 years, with a standard deviation of 1.5 years. Seventy percent (70%) of the students were female, and 30% male.

5.1 FOOD CHOICE AND THE THEORY OF REASONED ACTION

5.1.1 First Hypothesis

Students who intend to choose a particular food within the next week will have actually chosen the same food in an average week.

The students' intention to choose the food within the next week was positively correlated with their usual choice of the food. Large correlations occurred for biscuits (.719), breakfast cereal (.833), butter (.765), full cream milk (.787), polyunsaturated margarine (.737), soft drink (.788) and skim milk (.877). The remaining foods had moderate correlations ranging from .434 for margarine other than polyunsaturated to .679 for cake.

These results are displayed in **Table 5.1** and, being significant at the 0.5 level, supported the first hypothesis. This means that those students who intended to choose a food within the following week usually chose the same food in an average week. This hypothesis supported the Ajzen and Fishbein Model, that intention is a determinant of behaviour when the same context of target and time is used (Ajzen and Fishbein, 1980 p.51). Therefore, using intention in the regression analysis to evaluate the remaining variables was justified.

Table 5.1: Correlation Matrix of Usual Choice and Intended Choice

(Extract from full correlation matrix, **AppendixD**)

	APP	BIS	BKG	BRD	BUT	CAK	CHE	CKN	FUM	HCH	ICE	LAM	MPI	OJU	OMA	POT	PUM	SAU	SDK	SKM	STK	TOM
APP	0.673																					
BIS		0.714																				
BKG			0.873																			
BRD				0.530																		
BUT					0.765																	
CAK						0.679																
CHE							0.563															
CKN								0.517														
FUM									0.787													
HCH										0.644												
ICE											0.652											
LAM												0.575										
MPI													0.669									
OJU														0.643								
OMA															0.434							
POT																0.589						
PUM																	0.737					
SAU																		0.667				
SDK																			0.788			
SKM																				0.878		
STK																					0.584	
TOM																						0.674

5.1.2 Second Hypothesis

Students' attitudes towards the behaviour and students' subjective norms will predict intention to choose particular foods within the next week.

The sums of squares from the regression analyses were used to determine the contributions made by the two determinants, attitude and subjective norm, to the variation in intention. Attitude was more significant than subjective norm in accounting for the variation in intention for 86% of the foods.

Table 5.2 indicates that subjective norm significantly determined the intention for only three foods - bread, margarine other than polyunsaturated and potato. Attitude was the significant determinant in the remaining 19 foods. For ice cream and cake, however, attitude explained only slightly more variation in intention than did subjective norm. A similar situation existed for potato, where subjective norm explained only slightly more variation in intention than did attitude.

The above results support the hypothesis that intention can be predicted by attitude towards food behaviour and subjective norm. A significant amount of the variation in intention can be explained by the two variables. Attitude towards food accounted for a significant amount of the variation in intention for 86% of the foods in the survey.

Table 5.2: The Most Significant Determinant of Food Choice for Particular Foods

ATTITUDE	SUBJECTIVE NORM
Apple	Bread
Biscuits	Other margarine
Breakfast cereal	Potato
Butter	
Cake	
Cheese	
Chicken	
Full cream milk	
Hot chips	
Ice cream	
Lamb	
Meat pie	
Orange juice	
Polyunsaturated margarine	
Sausages	
Soft drink	
Skim milk	
Steak	
Tomato	

Table 5.3: Regression Equations for the 22 Foods and Food Groupings

Apple	B.I. =	.224 + .701 **L**
Biscuits	B.I. =	1.435 + .64 **L**
B'fast cereal	B.I. =	.14 + .854 **L**
Bread	B.I. =	.861 + .254 **P**
Butter	B.I. =	1.417 + .665 **L**
Cake	B.I. =	1.589 + .434 **L** + .363 **P**
Cheese	B.I. =	.524 + .72 **L**
Chicken	B.I. =	.619 + .711 **L**
Full cr milk	B.I. =	-.704 + .584 **L** + .367 **H** + .283 **P**
Hot chips	B.I. =	2.192 + .591 **L**
Ice cream	B.I. =	1.366 + .47 **L** + .328 **P**
Lamb	B.I. =	.05 + .65 **L** + .432 **P**
Meat pie	B.I. =	2.077 + .618 **L**
Orange juice	B.I. =	.16 + .538 **L** + .242 **P**
Other marg.	B.I. =	2.743 + .426 **P**
Potato	B.I. =	.141 + .337 **L** + .52 **P**
P.U. marg.	B.I. =	-.474 + .684 **L** + .354 **P**
Sausages	B.I. =	2.056 + .585 **L**
Soft drink	B.I. =	-.436 + .745 **L** + .323 **P**
Skim milk	B.I. =	-.515 + .939 **L** + .197 **P**
Steak	B.I. =	.089 + .579 **L** + .444 **P**
Tomato	B.I. =	.026 + .848 **L**
Milk group	B.I. =	7.334 + .366 **H**
Meat group	B.I. =	2.399 + .64 **L** + .323 **P**
Cereal group	B.I. =	6.305 + .423 **L**
Fr. & Veg gp.	B.I. =	.021 + .56 **L** + .307 **P**
Fats group	B.I. =	4.144 + .369 **L** + .288 **P**
Snack group	B.I. =	-1.548 + .42 **L** + .521 **H** + .284 **P**
Drinks group	B.I =	-.248 + .633 **L** + .316 **P**

Independent variables:

L = personal liking of food
H = perceived healthiness of food
P = perceived parents' usage of food
F = perceived friends' usage of food

5.1.3 Third Hypothesis

Students who like a particular food will

- intend to choose that food;

- choose that food.

Table 5.3 displays regression equations for 22 foods and food choices. This data indicates that "liking a food" occurred more as a predictor variable than did the other three variables of "healthiness", "parents' usage" and "friends' usage". Using $p < .001$, "liking the food" was the only significant determinant of food choice for ten foods - apple, biscuits, breakfast cereal, butter, cheese, chicken, hot chips, meat pie, sausage and tomato. The beta-weights for these foods ranged from .54 for hot chips to .858 for breakfast cereal. The cereal food group was the only grouped result which had "liking" as the only significant determinant variable.

For the remaining 17 foods and food groups, 3 did not include "liking" as a significant determinant. These were bread, margarine other than polyunsaturated and the milk group. Of the remaining 14 foods and food groups, "liking" was the best determinant of 13 of them. This meant that "liking the food" contributed more to the prediction of intention than the other variables of "healthiness" and "parents' usage". This was particularly the case for skim milk which had a beta weight of .939 for "liking" and a beta weight of .197 for "parents' usage". These results supported the third hypothesis. Students who liked a particular food had the intention to choose that particular food within the next week. As the correlations between intention and usual choice were moderate to high positive correlations, the second part of this hypothesis is also supported.

5.1.4 Fourth Hypothesis

Students who believe that a particular food is healthy will

- **intend to choose that food;**
- **choose that food.**

The variable of "healthiness" was a significant determinant (at the .001 level) in only three regression equations (**Table 5.3**). For the milk group it was the only significant determinant with a beta weight of .366, and for the snack group "healthiness" made the most contribution to predicting intention with a beta weight of .521. For full cream milk "healthiness", with a beta weight of .367, was the second best determinant of intention after "liking". The milk group included as one of its foods full cream milk and both the milk group and the snack group include ice cream. This inclusion could have contributed to the fact that "healthiness" was a significant determinant for these food groups.

Because there were only three occurrences where "healthiness" was a significant predictor of intention to choose, this hypothesis cannot be supported unconditionally. The fact that students believed a food to be healthy, did not necessarily mean that they consumed the food. Therefore, for 90% of foods and food groupings in this study, this hypothesis is rejected. As the correlations between intention and usual choice were moderate to high positive correlations, the second part of this hypothesis is also rejected.

5.1.5 Fifth Hypothesis

Students who believe that their parents choose a particular food often, will

- **intend to choose that food;**
- **choose that food.**

The variable of "parents' perceived usage" was a significant determinant (at the .001 level), in 59% of the foods and food groupings. **Table 5.3** shows that "parents' usage" was the only significant determinant in the regression equations for bread and margarine other than polyunsaturated. However, "parents' usage" was a better determinant of intention to choose potato than "liking". For the remaining 14 foods and food groupings, although "parents' usage" was a significant determinant it was not the best determinant with the beta weights ranging from .197 for skim milk up to .444 for steak.

These results supported this hypothesis for only 10% of the foods and food groupings. Despite the result that parents' choosing the food was a significant determinant in 59% of the 22 foods and the seven food groupings, it was only the strongest determinant for 14% of them. As the correlations between intention and usual choice were moderate to high positive correlations, the second part of this hypothesis is also supported for only 10% of the foods and food groupings and rejected for 90% of them.

5.1.6 Sixth Hypothesis

Students who believe that their friends choose a particular food often, will

- intend to choose that food;

- choose that food.

As can be seen from **Table 5.3,** the variable of "friends' perceived usage" was not a significant determinant in any of the regression equations of the foods or food groupings.

Therefore, this hypothesis is rejected. The fact that students perceived their friends choosing these foods, did not predict their intention to choose the foods. Similarly, "friends' usage" was not a determinant for the students' usual choice of the foods.

5.2 DEMOGRAPHIC COMPARISONS

5.2.1 The Population

The student distribution was evenly spread across the three schools: students in Arts and Music made up 32%, Teacher education 38%, and Sports and Leisure Studies students made up 30% of the study.

Figure 5.1 indicates the frequency distribution of living arrangements of students. It shows that 88% of the students lived at home with at least one parent or other older

person, 5% lived on their own while 7% lived with a friend or spouse.

Figure 5.2 shows the frequencies of whether the students had not studied or had studied nutrition before. Approximately one third (36%) of the students had not studied nutrition before while 59% had studied nutrition while at high school. The 14 students (5%), mostly Sports and Leisure Studies students who had studied nutrition elsewhere, did so through ACHPER, TAFE, university or nursing courses.

The amount of exercise and regular sport activity in which the students participate is shown in **Figure 5.3.** Sixty five percent (65%) of students consciously exercise or play sport on at least three days a week, while 21% of the students do not consciously exercise at all.

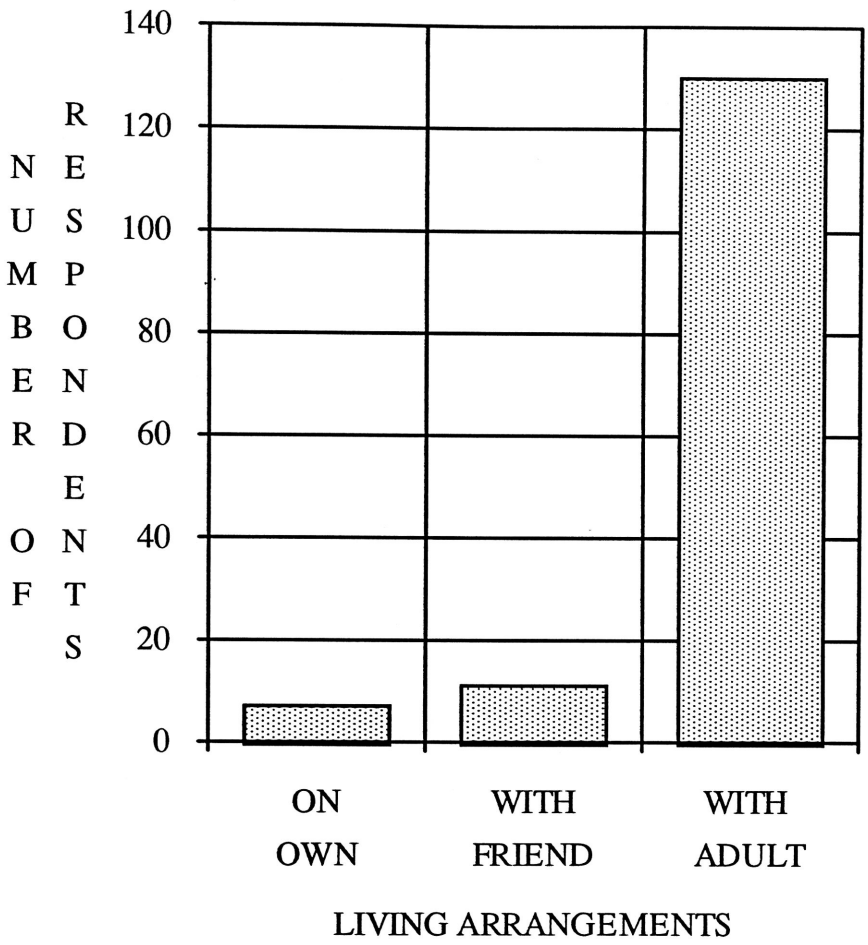

Figure 5.1: Living Arrangements of Students

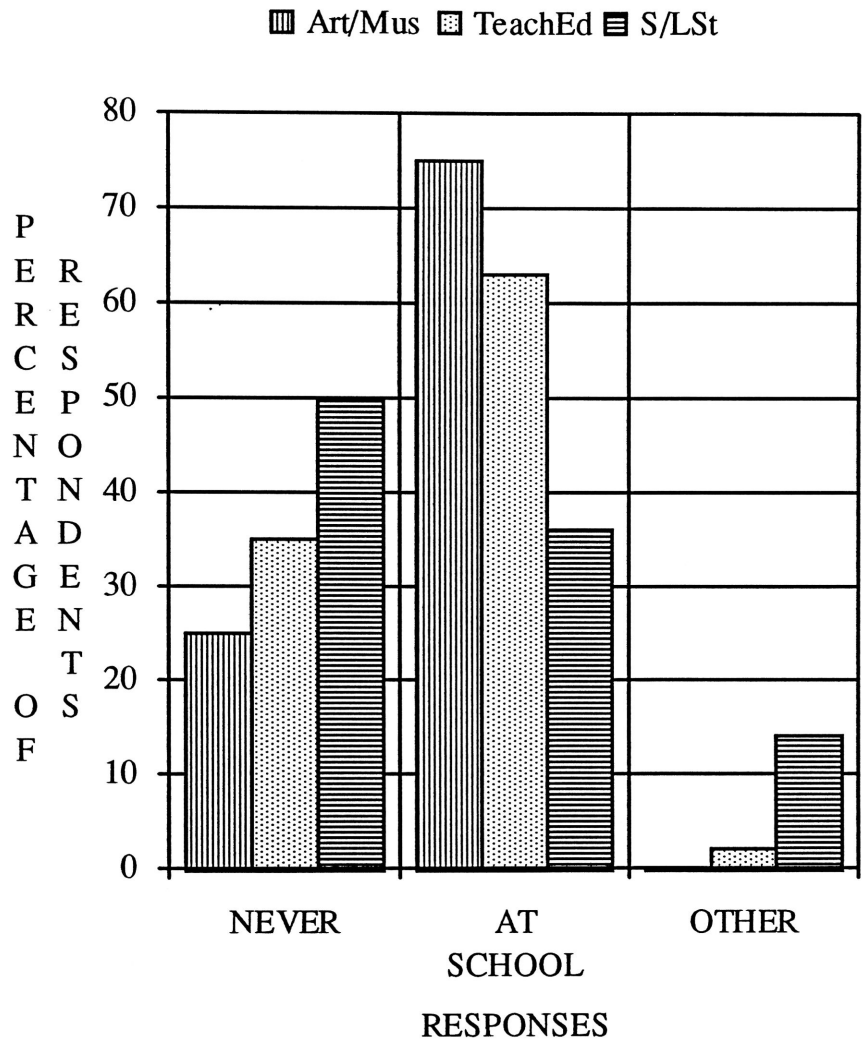

Figure 5.2: Responses to the Question "Have you studied nutrition before? If yes, where?"

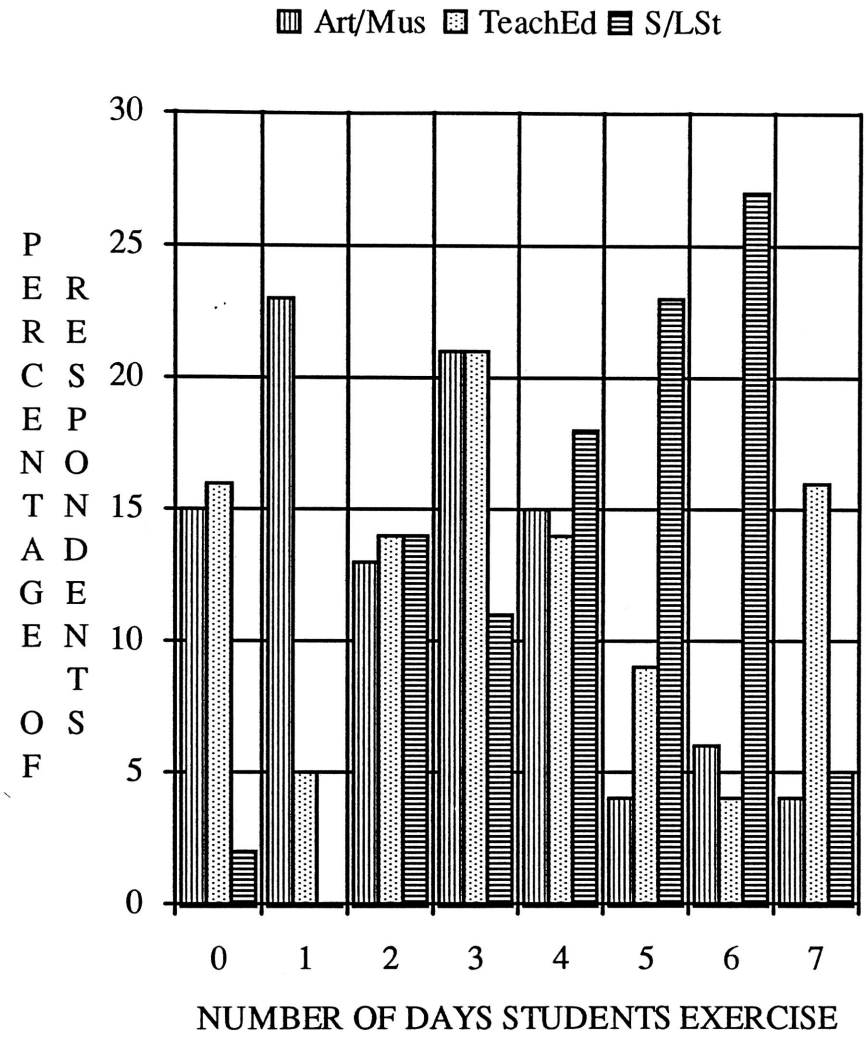

Figure 5.3: Frequency of Exercise or Sport Participation.

5.2.2 Food Behaviour

The means of the students' frequency of choice for each of the 22 foods, over an average week is shown in **Figure 5.4.** Bread is the most frequently chosen food, being chosen on an average of almost six days a week. Orange juice, breakfast cereal and apple are chosen on an average of four days a week by the students. Although there was no statistical difference between the males and females in choice frequency of the 22 foods, males reported choosing breakfast cereal more frequently than females.

From **Figure 5.4,** it can also be seen that snack items, such as cake, hot chips and ice cream are chosen on an average of once a week, while soft drink and biscuits are chosen on approximately three days a week.

Figures 5.5 to 5.11 show in graphical form the importance of factors that influence the students when they are deciding whether or not to choose a food. "Like" and "taste" were considered to be important considerations in food choice by the majority (70% and 65% respectively) of students. Although healthiness was still a consideration for students when making food choices, it was not as strong a consideration as liking the food or the preferred taste. The two influencing factors of "parents" and "friends" were reported to be never a consideration by 76% and 79% of the students.

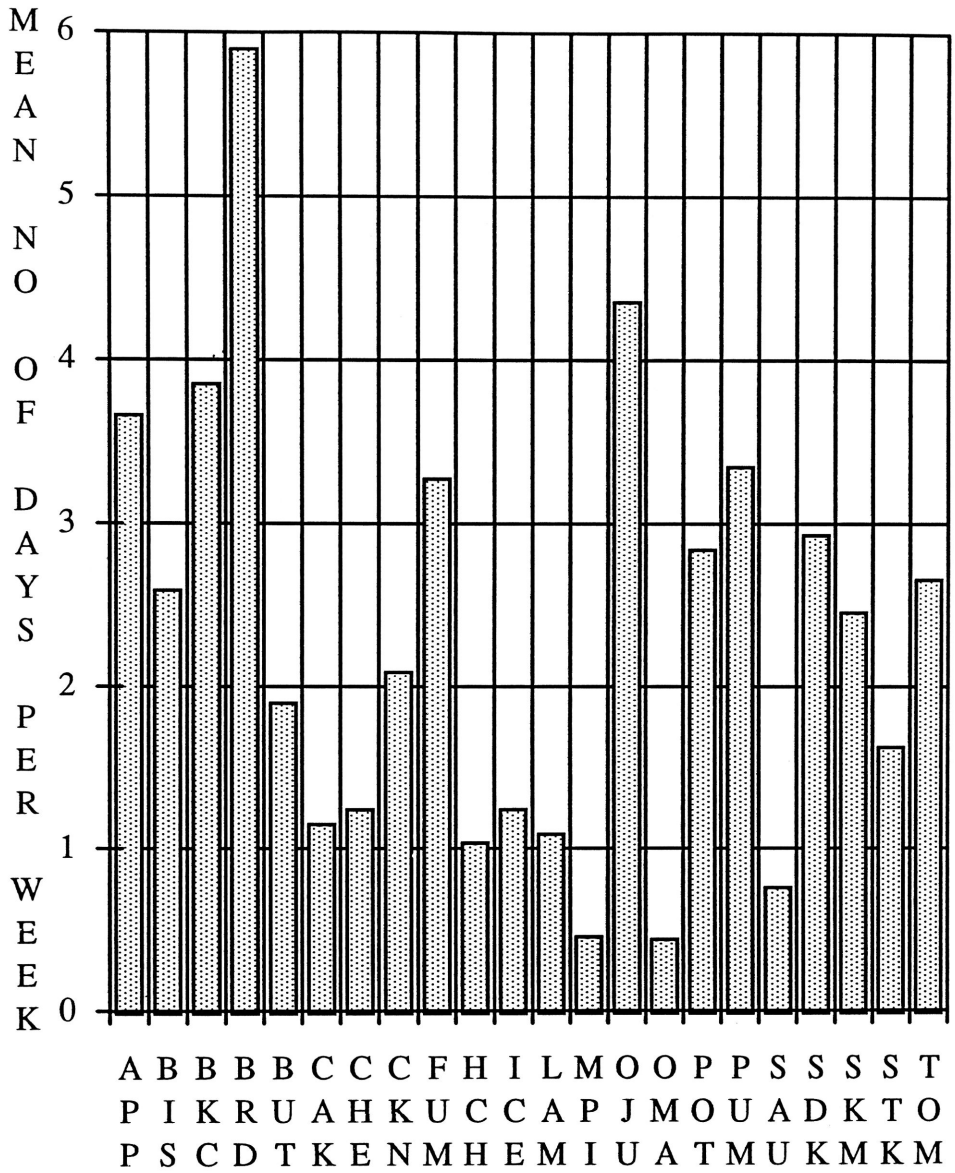

Figure 5.4: Mean Values of Students'Choices Over an Average Week.

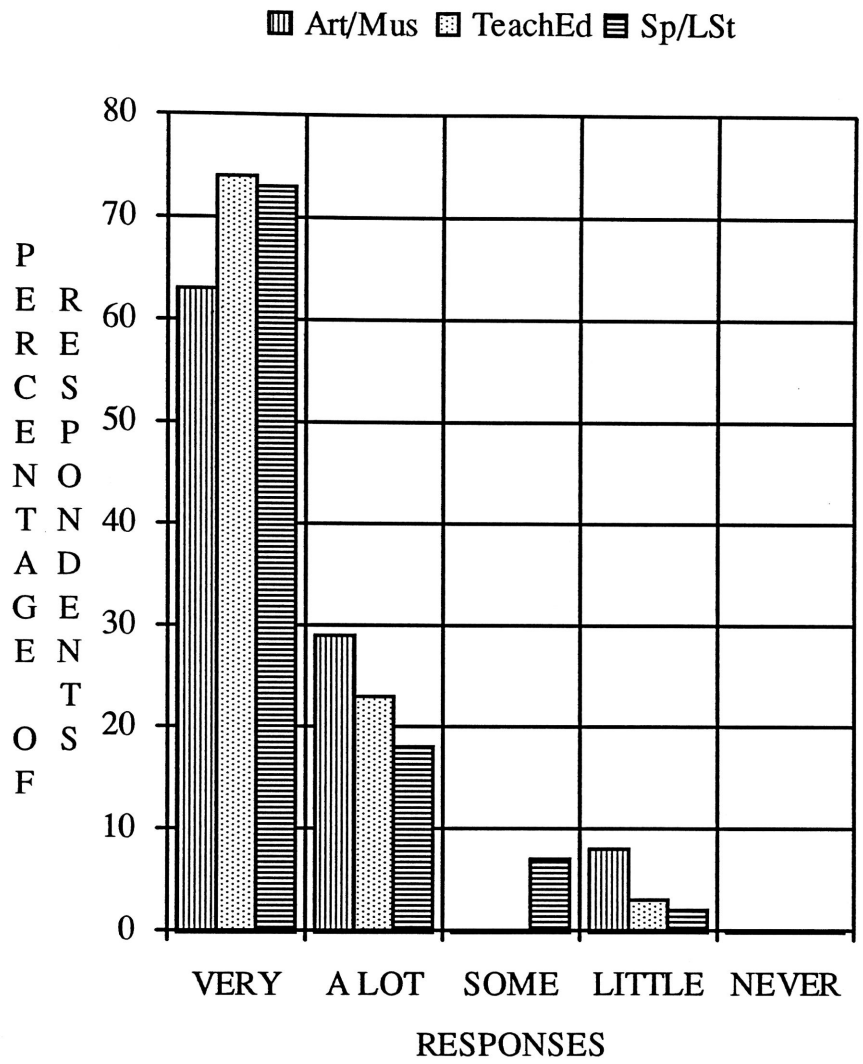

Figure 5.5: Response to the Question "How much does liking matter when making food choices?"

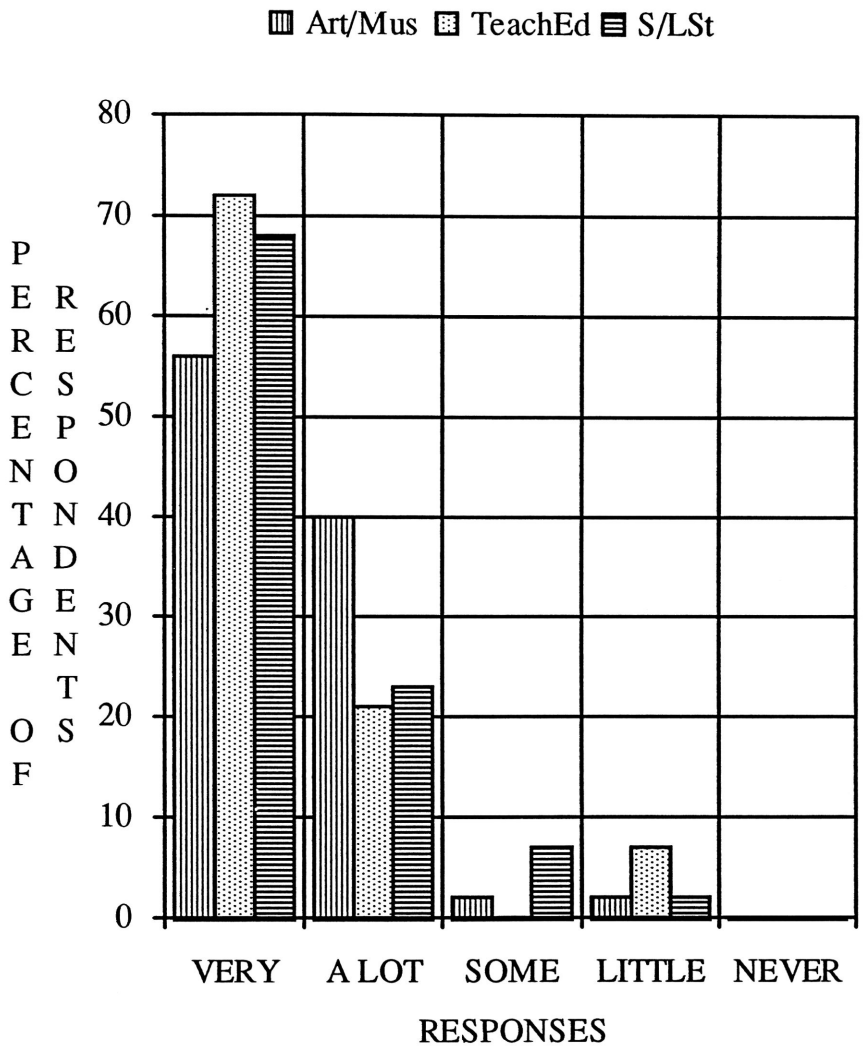

Figure 5.6: Response to the Question "How much does taste matter when making food choices?"

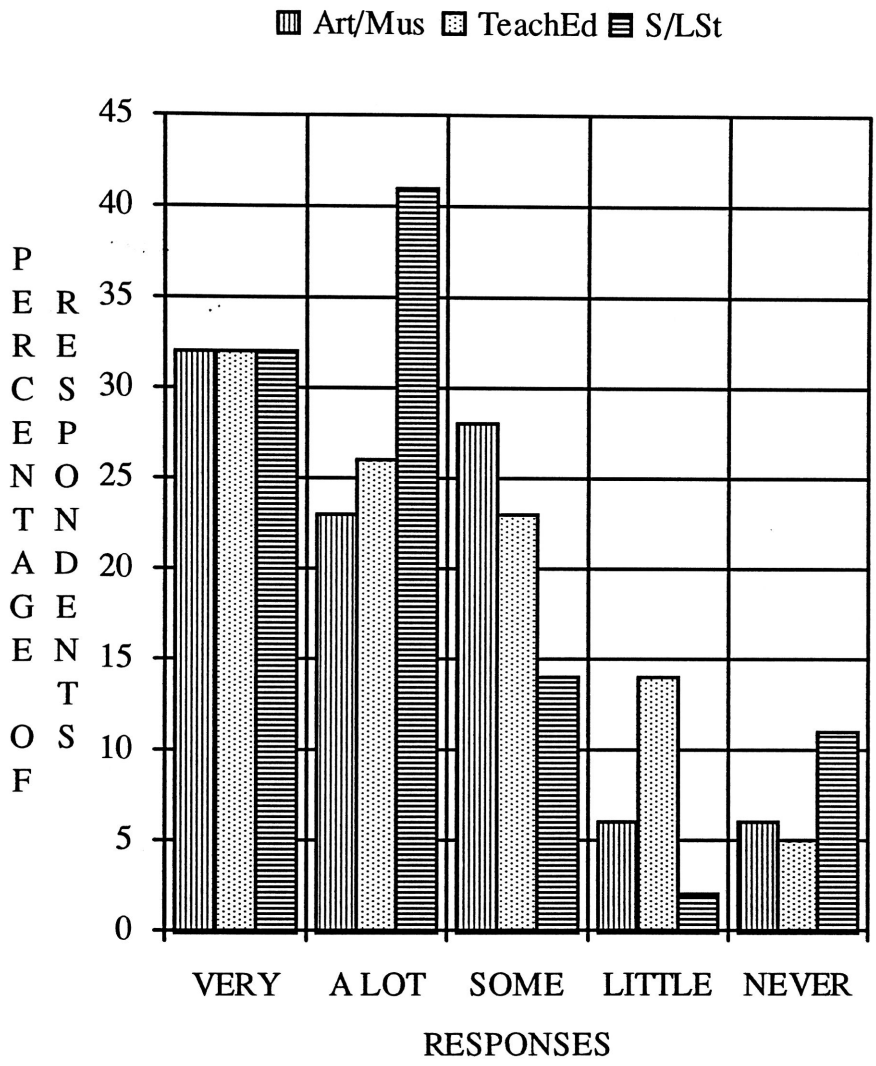

Figure 5.7: Response to the Question "How much does health matter when making food choices?"

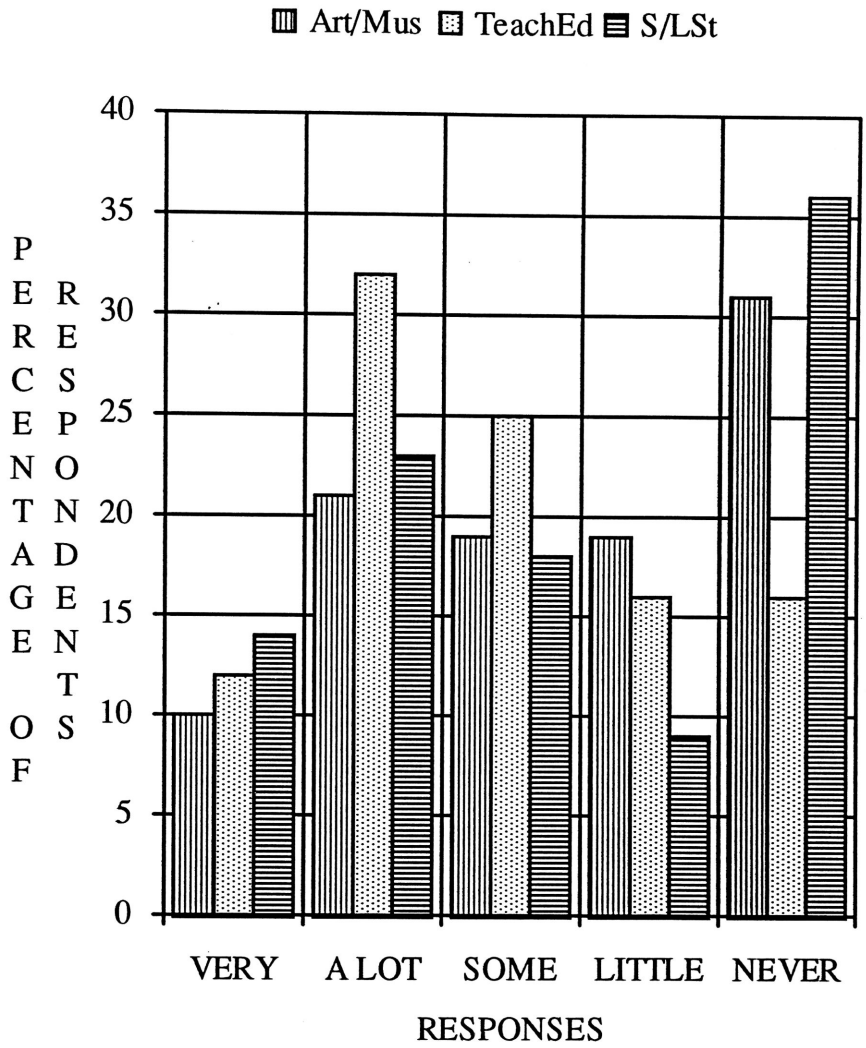

Figure 5.8: Response to the Question "How much does having eaten the food before matter when making food choices?"

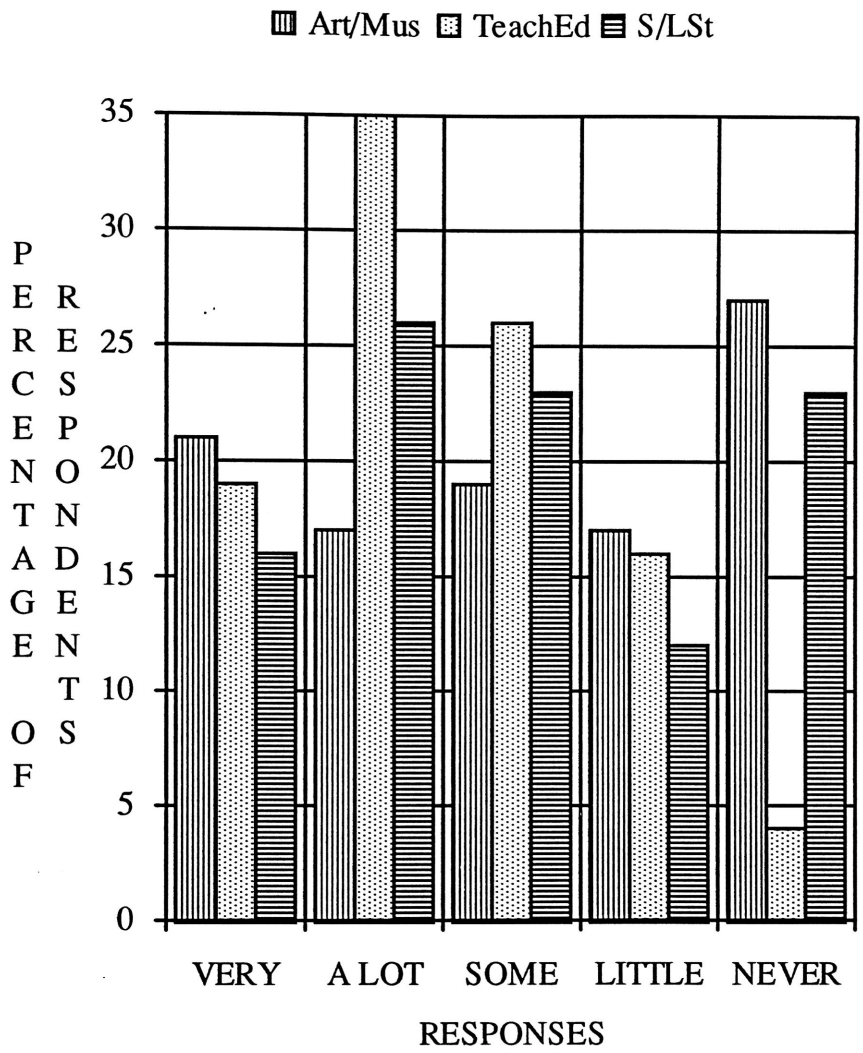

Figure 5.9: Response to the Question "How much does the look of the food matter when making food choices?"

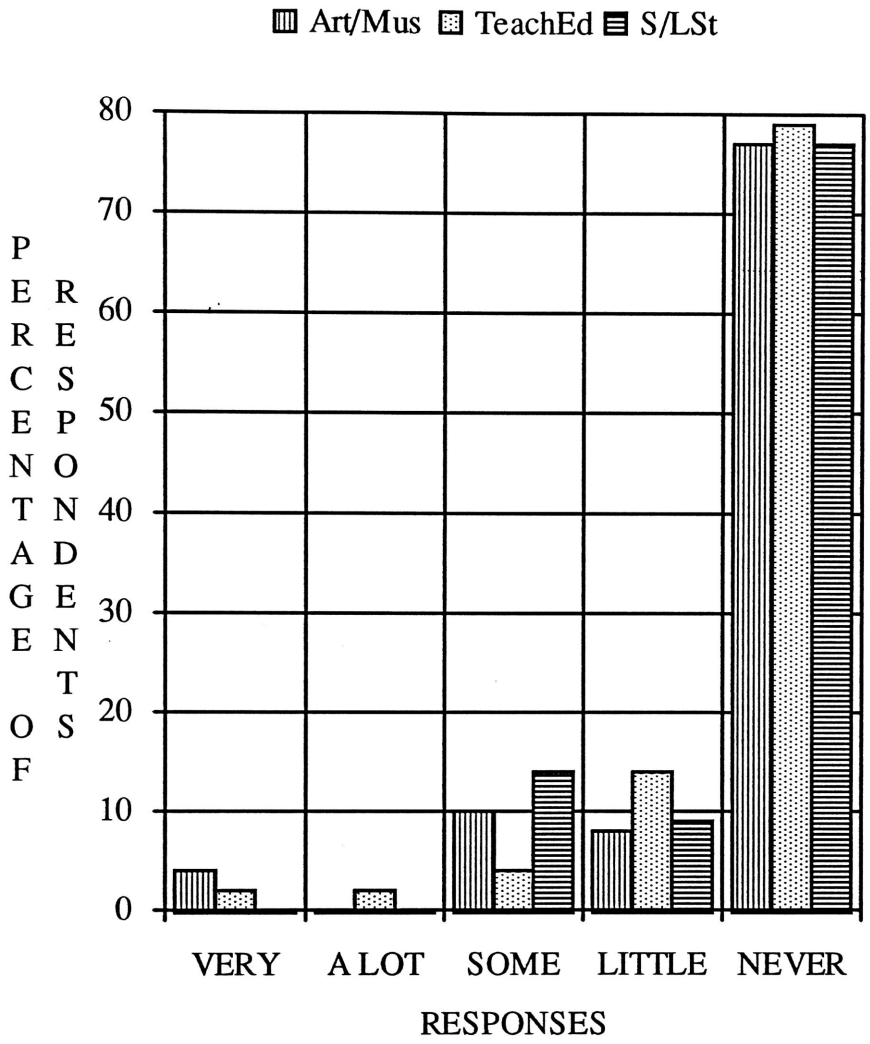

Figure 5.10: Response to the Question "How much does parents' opinion matter when making food choices?"

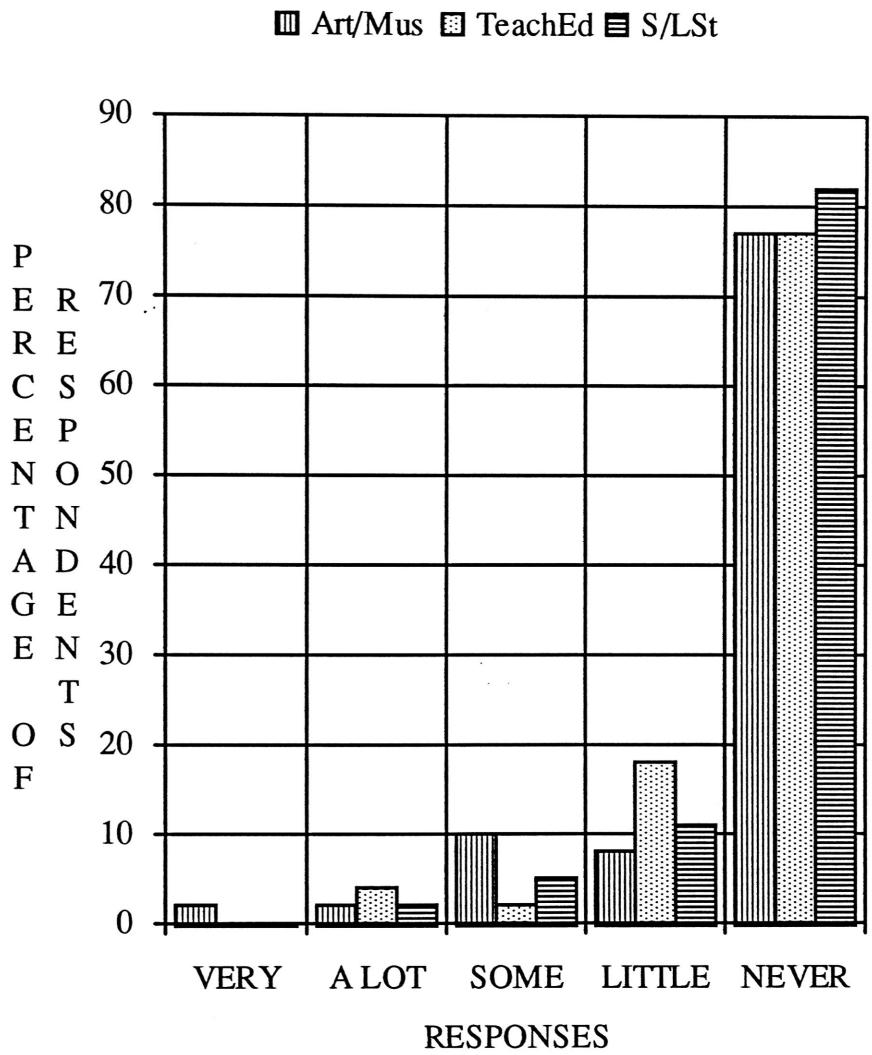

Figure 5.11: Response to the Question "How much does friends' opinion matter when making food choices?"

CHAPTER 6

DISCUSSION AND CONCLUSION

A single study within one university forms an inadequate basis for coming to firm conclusions about the content of nutrition education programs for students as a whole. Therefore, caution needs to be exercised in drawing conclusions beyond the students enrolled at the University of New South Wales, St George Campus. However, there are several conclusions which will be useful in further discussions with other nutrition educators.

6.1 THEORY OF REASONED ACTION

6.1.1 Intention and Behaviour

The support found for the first two hypotheses indicates that the Theory of Reasoned Action could be used to predict food choice in first year students. Food choice was determined by intention to choose, or not to choose, a specific food within a set time frame. Attitude was a better predictor than subjective norm of intention to choose the food for 86% of the foods surveyed. These results supported previous studies by Shepherd and Stockley (1987), who found attitude a better predictor for intention to consume fatty foods.

6.1.2 The Attitude Determinants

The support found for the third hypothesis, that liking the food was a major determinant of intention to choose the food, indicated that beliefs and values were based largely on personal preference (liking the food). In this study perceived health value of a food did not prove to be a significant predictor of intention to choose that food. These results were consistent with those of Woodward et al (1991), who studied younger adolescents, where liking a food was the main attitudinal determinant of choosing that food.

However, the students reported that "healthiness" was of considerable concern when they made food choices, despite the fact that the health value of the food was a significant determinant of intention to choose only one food - full cream milk. There were two groupings of the foods which also included "healthiness" as a significant determinant of intention to choose. The milk group, made up of cheese, full cream milk, low fat and skim milk, and ice cream and the snack group which also included ice cream. The fact that milk and milk products were the only foods where the health value was a significant determinant, could be the result of increased familiarity due to years of milk promotion emphasising the health benefits of milk, or from childhood influences when parents stressed the importance of drinking milk.

6.1.3 The Subjective Norm Determinants

Results indicated that perceived parental choice was a significant determinant for intention to choose in 59% of the foods in the questionnaire. This means that the subjective norm component of the Model, although the most influential determinant in only three foods, was

still a significant part of the Model. The strength of parental usage as a predictor was not reported by Woodward et al (1991), however, perceived parental usage may be a less important predictor of intention for this study than the study on younger adolescents done by Woodward et al (1991). Shepherd (1990) supported this notion in a study of adults which showed subjective norm to be an insignificant predictor. It can be explained by the fact that as adolescents mature emotionally, they develop their own value system, becoming less influenced by parents and other adults (Williams & Worthington-Roberts, 1988 p 302). Similarly, Court (1988) found that as adolescents developed from 11 through to 18 years, these adolescents indicated a decreasing reliance on mothers for nutritional guidance. As this maturity continues and experimentation with foods increases, it is important that they learn to make wise food choices.

Woodward et al (1991), reported that perceived friend's usage was a significant predictor of choice for snack items. In contrast, this study did not show any influence of perceived friends' usage on food choice, even for snack items, again perhaps because of the increased reliance on their own value systems.

6.2 FOOD BEHAVIOUR

Students enrolled in first year in the three schools at the St George Campus of the University of New South Wales exhibited no statistical difference between the determinant components of the Model - attitude and subjective norm. The students enrolled in Sports and Leisure Studies were no more influenced by beliefs and values than students in the Arts and Music or Teacher Education Schools. Even in the self reporting of influences such as personal liking, personal taste, the health value of the food, and parents and friends, the students'

responses from the different schools did not differ. These results do not support the findings of Saunders and Rahilly (1990) who found that the students in health based courses were more influenced by beliefs and values, while students in non health based courses were more influenced by subjective norms.

The fact that no difference occurred between the students enrolled in the three schools is understandable as at the time the students completed the questionnaire none of the students had taken a nutrition course. A similar study on third year students may show a difference in the relative weighting of the attitude and subjective norm components of the Model. Students enrolled in Sports and Leisure Studies complete at least one subject in nutrition by third year, and this, according to Skinner (1991) should result in a significant change in food choice. The cause of this change in behaviour and an investigation into whether the health value of the food has a greater influence on third year students' food choice could be an area of further research.

The fact that Teacher Education students are more frequently influenced by how the food looks and the fact that they have eaten the food before, may be explained by the fact that presentation and appearance is a component of their course. However, it does not explain why the students in Arts and Music, who would also study presentation, are not influenced by the same factors. Further investigation into these influences with other students may clarify this result.

All the students in this study indicated that taste and liking were of similar concern when they selected food, a point which Rozin (1984) and Rolls (1988) outline in discussions of the acquisition of likes and dislikes. The relationship between the taste and the liking of a food is complicated by social, cultural, physiological and emotional factors. It is acknowledged

that changing students' likes and dislikes forms a complication when designing nutrition programs.

6.3 IMPLICATIONS FOR NUTRITION EDUCATION

The inferences from these results for nutrition education of first year university students are that of the two determinants measured, that is attitude and subjective norm, attitude is important in determining food choice and should be addressed in any nutrition program. In particular, personal preferences of liking and taste need to be an integral part of learning about nutrition to broaden students' experience. Providing only knowledge based information on the health value of foods would not be appropriate for students when liking and parental usage were the main predictors of intention and behaviour.

6.3.1 When Liking the Food is Important

As "liking" was the significant determinant in 86% of the foods in the questionnaire, changing the beliefs and values associated with liking a food is the best way to change students' food habits. The food with "liking" as the strongest determinant was "skim or low fat milk". From the regression equation this food had a beta weight of .939 for the major predictor of liking, and only a beta weight of .197 for perceived parental usage. Healthiness was not a significant determinant for skim milk. If an education session were to discuss the health benefits of skim or low fat milk such a session would not be of great value in changing the attendees' intention to choose skim or low fat milk. A better approach would be to include some tasting of the milks in order to change personal beliefs, firstly by

increasing exposure (Rozin, 1984) and secondly as a support to the knowledge based information being provided.

This approach was used when the new "Lite White" flavoured milks were introduced (Sally Burt, 1991 - personal communication). It was reported to the Milk Marketing Authority that women in the 20 to 40 age group were frequently not consuming milk because of either the fat content of the full cream milk or the taste of the skim milk. Adding flavouring to the low fat milk improved the taste appeal and thus increased the consumption of milk by women (Sally Burt, 1991 - personal communication).

Other foods where liking was the major determinant of intention included apple, breakfast cereal, cheese, chicken and tomato. To increase the frequency of choice of such foods the process should be as outlined for skim milk. However, when the nutrient content of the food is not considered as ideal, such as in biscuits, hot chips and meat pie, then changing someone's liking of a food to a dislike is a more complicated process. Rozin (1984) suggests that developing a dislike for a food usually is associated with some unpleasant belief or consequence. However, in the educational setting the development of such associations is impractical. Instead, it is advised that increasing the frequency of favourable or healthy food choice will create a corresponding decrease in food choice considered undesirable.

6.3.2 When Parental Usage is Important

The first year students questioned were greatly influenced by their parents' choice of foods such as potato, bread and margarines other than poly unsaturated. The choice of staple foods such as these is a result of cultural influences, which after years of development are difficult

to alter (Rolls, 1988). This study did not differentiate between the available varieties of bread, preparation methods of potatoes or types of other margarines, but in nutrition programs the emphasis should be on the more desirable preparation methods and varieties. If the usual behaviour pattern of a food is difficult to alter, as may be the case with staple foods, then changing to a more desirable variety of the same staple food may be more feasible.

Education programs for university students should include information on the different varieties of a food currently available. Skinner (1991) found that students' food behaviour, as well as knowledge and attitudes, could be improved during a tertiary nutrition course. Therefore, in order to promote changes in food behaviour, it is necessary to provide the students with the knowledge and skills which they can use to make wise food choices. Developing critical evaluation skills for the wide varieties of the different food available on the marketplace will contribute to the success of any nutrition course.

6.4 FUTURE RESEARCH

As perceived parental usage was a significant determinant of intention to choose for 59% of the foods and despite the students' self reported denial of parental influence in food choice, some consideration of locus of control may be beneficial in any future study on student food choice. In addition, the fact that 88% of first year students questioned indicated that they lived at home with at least one parent or adult, supports the inclusion of a measure of perceived control in the questionnaire as investigated by Ajzen and Madden (1986), Netemeyer and Burton (1990) and Netemeyer, Burton and Johnston (1991).

Investigation into third year students' food choice, using the Theory of Reasoned Action, may illustrate the changes in the relative importance of the determinants of intention. Further studies might clarify these determinants and enrich the explanation of food behaviour, as well as examine the effectiveness of nutrition courses. Although the Ajzen and Fishbein Model was able to explain the food behaviour of the older adolescent, it is hoped further research may lead to a better model being developed.

The questionnaire used for this study was very closely based on that use by Woodward et al (1991). The inclusion of foods which older adolescents eat and choose for themselves, may improve the value of the results obtained from the Ajzen and Fishbein Model.

6.5 CONCLUSION

Despite the study's limitations, this study successfully explained the food choice of first year university students using the Ajzen and Fishbein Model (1980). It also showed that liking the food and perceived parental usage were the major determinants of the students intention to choose the foods.

It is recommended that when designing nutrition programs for this age group, the inclusion of taste tests of healthy foods would increase exposure and familiarity, thus increasing the likelihood of changing food behaviour. Also, it is recommended that knowledge about the wide variety of foods available, and evaluation skills to use this knowledge, be an integral part of such a course.

Nutrition programs using taste tests of nutritionally sound foods with knowledge of and evaluation skills for the different varieties of foods available should ensure that food behaviour is improved as opposed to nutrition programs which are purely knowledge based.

APPENDIX A

THE QUESTIONNAIRE

FOOD CHOICE SURVEY

This survey is about some foods you are likely to have eaten and what you think about these foods.

Your name is not required on the questionnaire and your answers will be completely confidential. There are no right or wrong answers.

For each food, or question, tick only one box or circle only one answer.

Please answer the following questions before turning the page.

1. How old are you? [ ] years.

2. Are you male? [ ] female? [ ]

3. Which school are you enrolled in?
   - Arts & Music [ ]
   - Teacher Education [ ]
   - Sport & Leisure Studies [ ]

4. Currently you are living:-
   - on your own [ ]
   - with friend/s or spouse [ ]
   - at home with at least one parent or other older person [ ]

5. What is your height? [ ] cm weight? [ ] kg

6. Have you ever studied nutrition?:
   - never [ ]
   - at high school [ ]
   - other _____ [ ]
     (please specify)

7. How many days/week do you consciously do some exercise or play sport?
   0 1 2 3 4 5 6 7

SECTION A:
For each of the foods listed, please answer both questions.

	Did you eat or drink the food yesterday? (circle ONE answer)		In an average week, on how many days would you eat it? (circle ONE answer)
Low fat or skim milk (plain or flav.)	yes	no	0 1 2 3 4 5 6 7
Full cream milk (plain or flavoured)	yes	no	0 1 2 3 4 5 6 7
Icecream	yes	no	0 1 2 3 4 5 6 7
Cheese	yes	no	0 1 2 3 4 5 6 7
Meat pie	yes	no	0 1 2 3 4 5 6 7
Lamb	yes	no	0 1 2 3 4 5 6 7
Steak	yes	no	0 1 2 3 4 5 6 7
Sausages	yes	no	0 1 2 3 4 5 6 7
Chicken	yes	no	0 1 2 3 4 5 6 7
Bread	yes	no	0 1 2 3 4 5 6 7
Breakfast cereal	yes	no	0 1 2 3 4 5 6 7
Biscuits	yes	no	0 1 2 3 4 5 6 7
Cake	yes	no	0 1 2 3 4 5 6 7
Hot chips	yes	no	0 1 2 3 4 5 6 7
Boiled or mashed potato	yes	no	0 1 2 3 4 5 6 7
Tomato	yes	no	0 1 2 3 4 5 6 7
Apple	yes	no	0 1 2 3 4 5 6 7
Butter	yes	no	0 1 2 3 4 5 6 7
Poly-unsaturated margarine	yes	no	0 1 2 3 4 5 6 7
Other margarine	yes	no	0 1 2 3 4 5 6 7
Soft drink	yes	no	0 1 2 3 4 5 6 7
Orange juice	yes	no	0 1 2 3 4 5 6 7

SECTION B:
How much do you like each of these foods?

	love it <----------> hate it					never tried it
Steak	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Chicken	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Lamb	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Sausages	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Orange juice	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Icecream	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Bread	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Poly-unsaturated margarine	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Other margarine	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Boiled or mashed potato	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Low fat or skim milk (plain or flav.)	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Full cream milk (plain or flavoured)	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Tomato	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Butter	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Cheese	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Cake	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Meat pie	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Biscuits	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Cordial or soft drink	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Apple	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Breakfast cereal	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Hot chips	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

SECTION C:
How healthy do you think it is to eat these foods?

	very healthy <----------> very unhealthy					I really don't know
Bread	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Cheese	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Breakfast cereal	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Biscuits	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Poly-unsaturated margarine	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Other margarine	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Hot chips	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Lamb	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Steak	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Tomato	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Cake	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Butter	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Apple	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Chicken	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Low fat or skim milk (plain or flav.)	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Full cream milk (plain or flavoured)	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Boiled or mashed potato	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Meat pie	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Orange juice	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Sausages	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Icecream	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Soft drink	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

SECTION D:
Please answer the following questions about yourself.

1. When deciding whether to eat a food, how much does it matter to you...

	matters very much <----------> doesn't matter at all				
whether you like the food?	[ ]	[ ]	[ ]	[ ]	[ ]
what it tastes like?	[ ]	[ ]	[ ]	[ ]	[ ]
whether it is healthy?	[ ]	[ ]	[ ]	[ ]	[ ]
whether you have eaten it before?	[ ]	[ ]	[ ]	[ ]	[ ]
what it looks like?	[ ]	[ ]	[ ]	[ ]	[ ]
what your parents would think about you eating it?	[ ]	[ ]	[ ]	[ ]	[ ]
what your friends would think about you eating it?	[ ]	[ ]	[ ]	[ ]	[ ]

2. Do you think you body is

	too thin <----------> too fat?				
	[ ]	[ ]	[ ]	[ ]	[ ]

3. Do you think your eating habits are.....

	very healthy <----------> very unhealthy				
	[ ]	[ ]	[ ]	[ ]	[ ]

4. Do you restrict your intake to particular foods or types of food?

No [ ]
Yes [ ] If Yes, is it for
- losing weight? [ ]
- vegetarianism? [ ]
- an allergy? [ ]
- a medical condition? [ ]
- other? (please specify) [ ]

_____
_____

SECTION E:

How likely is that that you will eat these foods within the next week?

	very likely <----------> very unlikely					I really don't know
Meat pie	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Butter	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Icecream	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Sausages	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Cake	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Chicken	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Bread	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Low fat or skim milk (plain or flav.)	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Full cream milk (plain or flavoured)	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Apple	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Steak	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Soft drink	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Lamb	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Biscuits	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Hot chips	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Boiled or mashed potato	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Poly-unsaturated margarine	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Other margarine	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Cheese	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Tomato	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Orange juice	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Breakfast cereal	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

SECTION F:
How often do you think that your parents would eat these foods?

	very often				very rarely	I really don't know
Apple	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Bread	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Breakfast cereal	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Low fat or skim milk (plain or flav.)	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Full cream milk (plain or flavoured)	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Chicken	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Cheese	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Poly-unsaturated margarine	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Other margarine	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Meat pie	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Soft drink	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Boiled or mashed potato	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Tomato	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Orange juice	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Hot chips	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Butter	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Cake	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Icecream	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Steak	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Sausage	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Lamb	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Biscuits	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

SECTION G:
How often do you think that your friends would eat these foods?

	very often				very rarely	I really don't know
Biscuits	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Breakfast cereal	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Orange juice	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Hot chips	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Soft drink	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Icecream	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Tomato	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Steak	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Sausages	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Apple	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Butter	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Poly-unsaturated margarine	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Other margarine	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Cake	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Cheese	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Chicken	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Meat pie	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Boiled or mashed potato	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Lamb	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Bread	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Low fat or skim milk (plain or flav.)	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Full cream milk (plain or flavoured)	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

Thank you for your time and effort in completing this questionnaire.

APPENDIX B

LIST OF 22 FOODS AND THEIR ABBREVIATIONS

APPLE	APP
BISCUITS	BIS
BREAKFAST CEREAL	BKC
BREAD	BRD
BUTTER	BUT
CAKE	CAK
CHEESE	CHE
CHICKEN	CKN
FULL CREAM MILK	FUM
HOT CHIPS	HCH
ICE CREAM	ICE
LAMB	LAM
MEAT PIE	MPI
ORANGE JUICE	OJU
OTHER MARGARINE	OMA
POLYUNSATURATED MARGARINE	PUM
SAUSAGE	SAU
SOFT DRINK	SDK
SKIM MILK	SKM
STEAK	STK
TOMATO	TOM

APPENDIX C

LETTER TO HEADS OF SCHOOL

8th August 1991

Dr.....

Head, School of.....

UNSW, St George Campus

Dear.....,

I am currently enrolled in the Master of Science (Nutrition and Dietetics) at Wollongong University. For the project component of the degree, I am undertaking to study the relationship between food behaviour and attitude and beliefs.

As a part of this project I would like to survey the first year undergraduate students enrolled in the School of ..... . The survey will involve completion of a questionnaire by 200-300 students of which I expect approximately 100 could come from your school. The questionnaire is based on one developed and used successfully by David Woodward from the Universtiy of Tasmania, Hobart.

The questionnaire should be ready by the end of August. I was hoping to access the students through the relevant lecturers. I would hope to make individual arrangements for distribution of the questionnaire to each lecturer's group of students, and subsequent collection of the completed questionnaires, with each lecturer.

I anticipate that it will take approximately 15 minutes to complete the questionnaire. Desirably the questionnaire should be completed by the students without them taking

the questionnaire away.

I would be happy to provide you with a copy of my report on completion of the project if you so desire.

Could you please advise me if I have your approval to survey your students, advise me of the lecturers that I may approach and your concurrence to the arrangements I may make with the various lecturers.

If you have any queries please do not hesitate to contact me on Ext 782 (Thursdays and Fridays) or put a note in my pigeon hole.

Thanking you in anticipation,

Barbara Eden
Nutrition Lecturer
School of Sport & Leisure Studies

APPENDIX D

CORRELATION MATRIX OF BEHAVIOUR AND INTENTION

(6 pages)

CORRELATION MATRIX OF BEHAVIOUR AND INTENTION

Correlation Matrix for Variables: X_1 ... X_{44}

	APP2	BIS2	BRD2	BKC2	BUT2	CAK2	CHE2	CHK2
APP2	1							
BIS2	-.203	1						
BRD2	-.002	.081	1					
BKC2	.148	.075	.084	1				
BUT2	-.042	.038	-.04	-.041	1			
CAK2	-.021	.34	-.09	-.078	.105	1		
CHE2	-.044	.248	-.062	.071	-.05	.369	1	
CHK2	-.035	.058	.002	-.206	.045	.187	.185	1
FUM2	-.085	.161	.013	.126	.077	.128	.146	.03
HCH2	-.203	.109	.025	-.162	-.084	.137	.264	.025
ICE2	-.044	.248	-.062	.071	-.05	.369	1	.185
LAM2	-.052	.173	.174	.01	.032	.02	-.031	.045
SKM2	.109	-.026	.026	.146	-.106	.028	-.005	.018
MPI2	-.151	.17	.062	.074	.066	.143	.277	.044
OJU2	.118	.066	.159	-.155	-.002	-.045	.014	.11
OMA2	.188	-.168	.104	-.011	-.088	-.03	-.114	-.071

Note: 12 cases deleted with missing values.

1

Correlation Matrix for Variables: X_1 ... X_{44}

	APP2	BIS2	BRD2	BKC2	BUT2	CAK2	CHE2	CHK2
PUM2	-.138	.084	.312	-.115	-.427	.149	.118	.165
POT2	.045	.168	.299	.093	.035	.047	.077	.027
SAU2	-.166	.25	.014	.003	.058	.326	.399	.112
SDK2	-.123	.295	.03	-.218	-.05	.078	.21	.029
STK2	-.12	.216	.128	-.031	-.046	.193	.222	.148
TOM2	.239	.03	.108	.043	-.024	-.004	.018	-.021
APP5	.673	-.167	.045	.114	.081	-.07	-.054	.009
BIS5	-.164	.714	.104	.072	.008	.331	.303	-.033
BRD5	.011	.168	.53	-.019	.118	-.016	-.05	.111
BKC5	.153	.012	.009	.833	-.113	-.06	.127	-.072
BUT5	-.035	.103	.021	-.008	.765	.182	.007	.002
CAK5	-.011	.346	-.034	-.109	.167	.679	.298	.233
CHE5	.077	-.036	.18	-.023	.162	-.051	.02	-.067
CHK5	.007	.126	.14	-.164	.086	.13	.093	.517
FUM5	.009	.109	-.027	.06	.127	.189	.127	.09
HCH5	-.178	.175	-.035	-.126	.004	.182	.263	.029

2

CORRELATION MATRIX OF BEHAVIOUR AND INTENTION

Correlation Matrix for Variables: X_1 ... X_{44}

	APP2	BIS2	BRD2	BKC2	BUT2	CAK2	CHE2	CHK2
ICE5	.037	.298	.013	.017	-.025	.355	.652	.068
LAM5	.083	.183	.167	-.007	-.003	.114	.035	.001
SKM5	.082	-.126	-.005	.074	-.107	-.065	-.055	.038
MPI5	-.084	.149	.058	.051	.048	.124	.235	-.005
OJU5	.18	.072	.17	-.063	.076	.029	-.024	-.049
OMA5	.068	-.088	-.062	-.119	.119	.155	-.038	.053
PUM5	-.142	.046	.196	-.027	-.274	.164	.068	.157
POT5	.189	.064	.258	.045	.125	-.034	-.084	-.01
SAU5	-.041	.26	.215	-.008	.006	.197	.312	-.01
SDK5	-.18	.255	-.006	-.218	-.063	.062	.195	-.018
STK5	-.035	.207	.148	.016	.096	.182	.121	.044
TOM5	.316	-.123	.046	.074	-.06	-.025	-.115	-.143

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Correlation Matrix for Variables: X_1 ... X_{44}

	FUM2	HCH2	ICE2	LAM2	SKM2	MPI2	OJU2	OMA2
FUM2	1							
HCH2	.058	1						
ICE2	.146	.264	1					
LAM2	.187	.11	-.031	1				
SKM2	-.634	-.016	-.005	-.033	1			
MPI2	.192	.141	.277	.048	-.201	1		
OJU2	-.082	-.001	.014	.019	-.021	.048	1	
OMA2	-.22	-.012	-.114	.064	.24	-.026	-.06	1

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CORRELATION MATRIX OF BEHAVIOUR AND INTENTION

Correlation Matrix for Variables: X_1 ... X_{44}

	FUM2	HCH2	ICE2	LAM2	SKM2	MPI2	OJU2	OMA2
PUM2	.199	.152	.118	.067	-.09	.133	.071	-.232
POT2	.087	-.01	.077	.223	.077	.181	.245	.07
SAU2	.204	.302	.399	.094	-.14	.411	.075	.032
SDK2	.017	.184	.21	.082	-.083	.309	.298	-.165
STK2	.121	.22	.222	.383	.005	.249	.085	.193
TOM2	.007	-.026	.018	-.047	.042	.051	.107	-4.94E-4
APP5	-.036	-.212	-.054	-.013	.102	-.111	.114	.09
BIS5	.259	.13	.303	.186	-.093	.248	.021	-.096
BRD5	-.021	.036	-.05	.164	-.03	-.024	.084	.023
BKC5	.048	-.157	.127	-.033	.123	.087	-.109	.002
BUT5	.155	-.056	.007	-.038	-.208	.112	-.002	-.151
CAK5	.148	.126	.298	.037	.012	.058	-.055	-.076
CHE5	.032	.137	.02	-.005	-.027	-.026	.015	.007
CHK5	.13	.086	.093	.224	-.126	.097	.144	-.108
FUM5	.787	.087	.127	.147	-.618	.161	-.026	-.189
HCH5	.101	.644	.263	.025	-.058	.17	-.05	-.006

Correlation Matrix for Variables: X_1 ... X_{44}

	FUM2	HCH2	ICE2	LAM2	SKM2	MPI2	OJU2	OMA2
ICE5	.111	.327	.652	-.085	-.045	.239	.006	-.117
LAM5	.226	.095	.035	.575	-.087	.06	.063	.01
SKM5	-.696	-.079	-.055	-.128	.877	-.178	-.042	.187
MPI5	.217	.163	.235	.14	-.176	.669	-.042	-.038
OJU5	-.014	-.003	-.024	-.087	.014	.069	.643	-.028
OMA5	-.131	.024	-.038	-.033	.108	.025	-.057	.434
PUM5	.088	.033	.068	.031	-.037	.026	.105	-.186
POT5	.034	-.09	-.084	.066	-.034	.036	.139	-.015
SAU5	.269	.265	.312	.077	-.185	.288	.05	-.08
SDK5	.112	.177	.195	.047	-.208	.242	.186	-.189
STK5	.247	.07	.121	.361	-.162	.192	.037	-3.52E-4
TOM5	.007	-.059	-.115	-.053	.033	-.013	.047	.081

CORRELATION MATRIX OF BEHAVIOUR AND INTENTION

Correlation Matrix for Variables: X_1 ... X_{44}

	PUM2	POT2	SAU2	SDK2	STK2	TOM2	APP5	BIS5
PUM2	1							
POT2	.19	1						
SAU2	.104	.139	1					
SDK2	.21	.109	.303	1				
STK2	.132	.286	.443	.298	1			
TOM2	.013	.051	.004	.005	.051	1		
APP5	-.07	.112	-.141	-.057	-.12	.1	1	
BIS5	.138	.121	.229	.278	.258	.098	-.149	1
BRD5	.178	.151	-.023	.099	-.024	.083	.151	.103
BKC5	-.091	.029	.019	-.158	-.006	.057	.171	.068
BUT5	-.266	-.004	-.009	-.085	-.105	-.037	.157	.123
CAK5	.165	-.003	.255	.158	.19	.048	.028	.418
CHE5	.084	.054	-.064	-.166	-.134	.052	.213	.087
CHK5	.208	.115	.163	.209	.169	.052	.118	.202
FUM5	.18	.015	.182	.067	.086	-.122	.062	.25
HCH5	.123	-.147	.273	.316	.116	-.053	-.089	.359

Correlation Matrix for Variables: X_1 ... X_{44}

	PUM2	POT2	SAU2	SDK2	STK2	TOM2	APP5	BIS5
ICE5	.206	-.045	.342	.264	.099	.036	.035	.328
LAM5	.245	.186	.138	.224	.362	-.17	.155	.354
SKM5	-.108	.015	-.187	-.063	-.043	.01	.076	-.16
MPI5	.128	.155	.383	.251	.166	-.019	-.021	.216
OJU5	.049	.166	.034	.216	-.062	.231	.256	.11
OMA5	-.106	-.034	.043	.036	.056	.017	.02	.035
PUM5	.737	.207	.095	.185	.047	-.056	-.027	.155
POT5	-.009	.589	-.035	.027	-.039	.105	.308	.085
SAU5	.154	.102	.667	.256	.298	-1.92E-4	-.029	.305
SDK5	.204	.011	.231	.788	.185	-.107	-.076	.333
STK5	.147	.167	.194	.18	.584	-.042	.067	.309
TOM5	.013	-.091	-.044	-.082	-.05	.674	.272	.049

CORRELATION MATRIX OF BEHAVIOUR AND INTENTION

Correlation Matrix for Variables: X_1 ... X_{44}

	BRD5	BKC5	BUT5	CAK5	CHE5	CHK5	FUM5	HCH5
BRD5	1							
BKC5	-.027	1						
BUT5	.172	-.063	1					
CAK5	.004	-.087	.232	1				
CHE5	.226	-.068	.288	.011	1			
CHK5	.327	-.104	.064	.244	-.002	1		
FUM5	.092	.001	.252	.23	.196	.202	1	
HCH5	.069	-.068	.043	.374	.213	.21	.228	1

Correlation Matrix for Variables: X_1 ... X_{44}

	BRD5	BKC5	BUT5	CAK5	CHE5	CHK5	FUM5	HCH5
ICE5	-.039	.074	.13	.479	.139	.111	.152	.43
LAM5	.258	-.026	.036	.27	.084	.368	.302	.229
SKM5	-.007	.095	-.235	-.048	-.07	-.122	-.62	-.113
MPI5	.04	.108	.09	.172	-.052	.16	.212	.232
OJU5	.148	-.03	.117	.049	.221	.074	.038	.081
OMA5	.02	-.04	.065	.13	.082	.046	-.016	.146
PUM5	.238	.008	-.154	.193	.143	.246	.18	.175
POT5	.192	.052	.144	.042	.258	.136	.053	-.031
SAU5	.072	-.002	.054	.29	.051	.227	.239	.325
SDK5	.096	-.172	-.034	.12	-.066	.239	.206	.382
STK5	.11	.06	.157	.314	.124	.397	.27	.188
TOM5	.003	.123	.009	.05	.296	-.073	.002	.004

CORRELATION MATRIX OF BEHAVIOUR AND INTENTION

Correlation Matrix for Variables: X_1 ... X_{44}

	ICE5	LAM5	SKM5	MPI5	OJU5	OMA5	PUM5	POT5
ICE5	1							
LAM5	.135	1						
SKM5	-.124	-.144	1					
MPI5	.261	.1	-.158	1				
OJU5	.106	.115	-.028	-.014	1			
OMA5	.017	-.025	.156	.048	-.085	1		
PUM5	.194	.297	-.009	.076	.135	.025	1	
POT5	-.041	.091	.015	.029	.206	.006	.107	1
SAU5	.446	.288	-.226	.435	.071	-.059	.175	.031
SDK5	.254	.274	-.169	.281	.203	-.048	.232	.003
STK5	.226	.622	-.233	.204	.11	-.026	.207	.035
TOM5	-.012	-.094	.044	-.007	.304	.05	-.028	.161

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Correlation Matrix for Variables: X_1 ... X_{44}

	SAU5	SDK5	STK5	TOM5
SAU5	1			
SDK5	.261	1		
STK5	.297	.202	1	
TOM5	.009	-.106	-.028	1

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APPENDIX E

LETTER OF APPROVAL FROM ETHICS COMMITTEE

(1 page)

UNIVERSITY OF WOLLONGONG
Office of the Vice-Principal (Administration)

Academic Services Branch
In Reply please quote: JLC:KR HE 91/92
Further Information: Denise Stevens (Ext 3386)

13 August, 1991.

Ms. Barbara Eden
c/o Department of Public Health and Nutrition
UNIVERSITY OF WOLLONGONG

Dear Ms Eden,

I am pleased to advise that the following Human Experimentation Ethics application has been approved:

Ethics Number:	HE 91/92
Project Title:	How effectively can the Ajzen and Fishbein Socio-Psychological model explain the food choices of older adolescents attending a metropolitan University.
Name of Researchers:	Barbara Eden
Approval Date:	13 August, 1991
Duration of Clearance:	30 December 1991

This certificate relates to the research protocol submitted in your application of 12 August, 1991. It will be necessary to inform the Committee of any changes to the research protocol and seek clearance in such an event.

Please note that experiments of long duration must be reviewed annually by the committe and it will be necessary for you to apply for renewal of this application if experimentation is to continue beyond one year.

Chairperson
Human Experimentation Ethics Committee

...../...../91.

cc. Head dept of Public Health and Nutrition.

Postal address: PO Box 1144 Wollongong NSW 2500 Australia
Location: Northfields Avenue Wollongong New South Wales Australia
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